

COMPUTERWORLD

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Unisys raises ceiling on 1100 series hosts

BY JAMES CONNOLLY
CW STAFF

BLUE BELL, Pa. — Unisys Corp. last week offered its high-volume transaction processing customers, including large international banks, a long-awaited growth path at the top of its

MIS seeks new life for old 8088s

BY ED SCANNELL
CW STAFF

In a youthful industry obsessed with pushing back technology's frontiers, old age is finally becoming an issue.

The largest corporations are buying more and more Intel Corp. 80286- and 80386-based microcomputers to work with next-generation operating systems, and they are now wrestling with the problem of what to do with their Intel 8088-based systems.

While many companies relegate the older machines to useful but mundane tasks such as data entry or stand-alone functions, some use them as oversize doorstops, and others have tried giving them away.

Not worth the effort

But sometimes even giving the computers away is difficult. Several large corporations contacted last week said they had explored the possibility of giving their unused 8088s to schools, churches and other charitable organizations but found it is not worth the effort.

"You spend a lot of time try-
Continued on page 4

1100 series of mainframes.

The Unisys 1100/94 Model II Turbo is slated to be offered to beta-test users next year but will not be available for general shipments until the first quarter of 1989.

The Turbo model is the second in what promises to be a series of enhancements for the 1100/90 series, according to Unisys. The line was introduced in 1983 by what was then Sperry Corp.

The Turbo features faster memory chips and software enhancements that combine to provide 25% performance gains in transaction processing environments compared with earlier 1100/94s, according to Jim Page, Unisys program manager for large-scale 1100 systems.

Page said only 5% to 10% of all 1100/90 users are immediate candidates for the Turbo models because most are not running fully configured systems. He said Unisys will soon ship the 1,000th 1100/90 processor, which is the largest uniprocessor in the 1100 family.

Even with the performance boost, the 1100/94 is generally rated at less than half the power of the high-end models of the second Unisys line of main-
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IBM turns up heat

Wheeling and dealing drives down 3090 prices

BY JEAN S. BOZMAN
and STANLEY GIBSON
CW STAFF

An aggressive IBM sales push, combined with spot surpluses of some machines, is forcing down prices on IBM 3090 mainframes and creating bargains for prospective buyers, according to leasing company officials and users.

Prices of used 3090 Model 200s have slid about 10% in the last four months, and leasing companies are having trouble placing the machines. Nearly 20 Model 200s are sitting in leasing

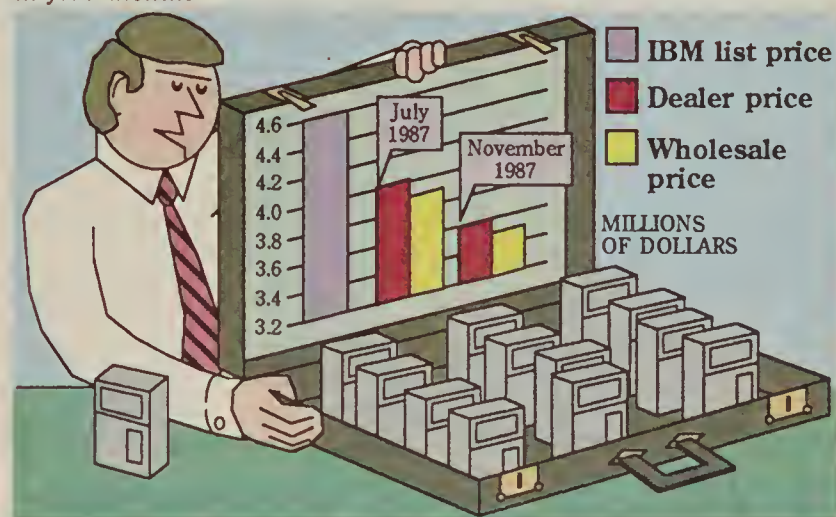
firm warehouses.

In addition, users in the market for new 3090s said last week that IBM has become unusually aggressive in trying to sell the mainframes.

"Our salesman said, 'How would you like to trade that [IBM 3084] in for a 3090 and pay for it in six months?'" said an MIS manager at a large, Midwestern user site that refused an IBM offer last month. "If you have a current need for a computer, it's a real good deal. By that time, the price might drop, and [IBM] would guarantee that you pay
Continued on page 6

Bargain hunting

Average prices on used 3090 Model 200s have dropped 10% in four months



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CW CHART: MITCHELL J. HAYES

LUCKY BREAK

From Russia with love

BY JULIE PITTA
CW STAFF

Call it scandal marketing. Call it high-tech high jinks.

But one official at Saxpy Computer Corp. calls the arrest of a former Saxpy worker charged with stealing company secrets for sale to the Soviet Union just plain lucky.

"It's given us the kind of exposure that otherwise would have taken us a long time to get," said Tony Yates, Saxpy's vice-president of sales and marketing. "We've gone from not being very well known to getting national attention. It's kind of enhanced our image."

It all started a month ago, when Saxpy officials arrived at work to find television crews

in the lobby of the company's Sunnyvale, Calif., headquarters. One of their former co-workers, Ivan-Pierre Batinic, had been arrested by the Federal Bureau of Investigation on conspiracy charges.

In the days following the arrest, news stories about the Saxpy theft appeared in major daily papers. The Saxpy incident was also covered on *NBC Nightly News* and the *Today* show.

The result of all this attention has been an increase in the number of phone calls to Saxpy, Yates said. The Matrix 1, Saxpy's first product, debuted in May at the International Supercomputing Conference. At the time of the arrest, Saxpy was receiving "only a couple" of calls a day regarding the Matrix 1,
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Onward. With hopes of changing the way end users interact with PCs, Mitch Kapor has launched On Technology. Anticipated software, using concepts similar to Lotus's Agenda, includes a flexible file system and customized applications. Page 4.

Upward. Excelan focuses on work groups with a line of networking products to help users communicate with a range of dissimilar host and departmental computers — without gateways. Page 10.

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"We found a lot of new software development masquerading as maintenance in agencies' budgets."

FRANKLIN S. REEDER
U.S. OFFICE
OF MANAGEMENT
AND BUDGET

Explaining his July 1986 directive that software maintenance expenses were to be cut 25% over a three-year period.

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NEWS

ADAPSO rallies forces in IBM policy scrap

BY MITCH BETTS
CW STAFF

ARLINGTON, Va. — ADAPSO last week urged IBM customers to join with the software industry association in a lobbying campaign to force IBM to back off its software bundling and object-code-only policies.

Charging that the policies are anticompetitive, the ADAPSO board of directors also instructed the staff to begin informal meetings with government anti-trust officials, including the U.S. Department of Justice, the Federal Trade Commission, congressional committees and the European Economic Community.

Talks with government officials, however, will not begin until after an ADAPSO board meeting scheduled for Dec. 9, at which members will review IBM's response to the complaints [CW, Nov. 16], according to ADAPSO spokesman Christopher R. Carleton. The organization's next steps will be determined by IBM's response, he said.

Continues to fight

IBM recently agreed to talk about source code needs with individual companies [CW, Nov. 16].

The ADAPSO board will review its commitment to the talks at the Dec. 9 meeting, and several members, including outgoing President Jay Goldberg, said the talks could resolve the source code issue on an individual company basis. Other members disagree, however, and ADAPSO is continuing its intent to carry the fight to trade and federal agencies until it sees concrete progress being made, ADAPSO members said.

No contacts with federal agencies or the European Economic Community are scheduled until late December, a board member said.

Product bundling and object-code-only policies discourage independent software vendors from creating competitive products, thereby limiting the variety of software products available to users and stifling innovation, ADAPSO charged in a Nov. 17 statement.

"ADAPSO wants all users to understand the issues and to join with us in approaching appropriate governmental, standards-setting and international organizations in promoting product choice and fair competition," said Jay N. Goldberg, the outgoing chairman of ADAPSO, in the written statement.

Carleton said that last week's announcement was "an extension of what the ADAPSO board agreed to in Colorado Springs" in September [CW, Oct. 5].

sion of what the ADAPSO board agreed to in Colorado Springs" in September [CW, Oct. 5].

Solution suggested

In an 11-page position paper, ADAPSO outlined a proposed solution to the controversy. It would provide independent software developers with access to IBM source code on a "need-to-know" basis and provide safeguards to ensure that IBM proprietary information is protected.

The paper addresses three IBM policies that ADAPSO found objectionable: A 1983 decision eliminating the availability of source code; a 1981 decision to bundle VSE/SP products; and a decision this past April to bundle the Personal System/2's operating system, Data Base Manager and Communications Manager in OS/2 Extended Edition.

ADAPSO made the following recommendations:

- IBM should make source code available to systems software companies upon written request, with stringent nondisclosure agreements for the company and employees. IBM can charge a reasonable fee to defray expenses. Source code should be made available when it is first issued within IBM for development purposes; and changes to the source code before the product is publicly announced should also be made available.

- Existing and new products offered by IBM should be narrowly defined, unbundled from other products and separately priced and marketed to customers. Disputes would be settled by an impartial arbitrator.

- IBM's planned OS/2 Extended Edition should be withdrawn from the market. The Data Base Manager and the Communications Manager should be released as separate products that can operate with OS/2 Standard Edition.

Goldberg characterized the lobbying campaign as pro-consumer, not anti-IBM. "As hardware prices fall, anything that allows a vendor to boost software prices artificially will help that vendor at the expense of the consumer, the computer software and services industry, and ultimately the U.S. economy," he said.

The U.S. government should support ADAPSO's position, Goldberg said, because the computer software and services industry is one of the few U.S. high-tech industries with a trade surplus. Goldberg also expressed hope that the European Economic Community will be receptive to ADAPSO's pleas.



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Kapor's On Technology fights sophomore jinx

BY DOUGLAS BARNEY
CW STAFF

CAMBRIDGE, Mass. — Mitchell D. Kapor last week jumped back into the industry he so radically changed five years ago. The Lotus Development Corp. founder formed a new company, On Technology, with the ambitious charter to change the way users interact with microcomputers.

But whether or not Kapor succeeds will remain unknown for at least two years. That is when On Technology expects to begin shipping its first products, a fuzzily defined set of systems software building blocks and applications that company officials say will allow computers to mimic the way people work.



Mitchell D. Kapor

The products, which will be initially available on Apple Computer, Inc.'s Macintosh, will use concepts similar to Agenda, an information manager recently announced by Lotus, which Kapor helped develop.

Kapor invested a "low seven figures" in the venture, according to Peter Miller, former director of advanced technology at Lotus and president of On Technology. Kapor will serve as chairman of the firm.

Kapor is also an investor and board member of Go Corp., a San Francisco-based company that will begin to release what it calls "a new class of productivity applications" in two to three years. The two firms are separate entities.

Building blocks

In order for On Technology to catch on, it must convince applications developers to write software that uses On Technology's building blocks.

Expected applications will focus primarily on hypertext, or the manipulation of text; hypermedia, the manipulation of text, data and images; groupware, applications for work groups; and public information systems.

On Technology will develop

an unspecified array of applications itself.

Unlike Apple, which essentially gives away extensions to its systems software, On Technology must sell its extensions.

As a result, "It will not be as universal as Hypercard," noted Jeff Tarter, editor and publisher of "Soft-Letter." Hypercard is a new breed of data base management system that Apple gives away or sells for a nominal charge.

One piece of On Technology's system software will attempt to replace traditional operating system hierarchical file structures with a more natural and flexible one.

"The file system part of existing operating systems is simply incompatible with the way people actually work and think," Kapor argued. "Documents and applications in the system should be able to use a kind of knowledge base about the information in the system that allows for flexible, creative storage and retrieval."

The software will use a form of artificial intelligence and object-oriented data base techniques.

Only just begun

For Kapor, the filing system is only the beginning. The larger problem involves end-user customization of applications.

"End users face a real problem in trying to customize applications to do exactly what they want or to automate repetitive applications. Existing conventional programming languages like C are just too difficult, and macro languages are not at the right level," Kapor said.

Kapor said that under his system, the software will have the ability to learn what a user wants to do and then help automate that process. For example, the system may surmise that a user is developing a report and prepare the system to print.

Required reading

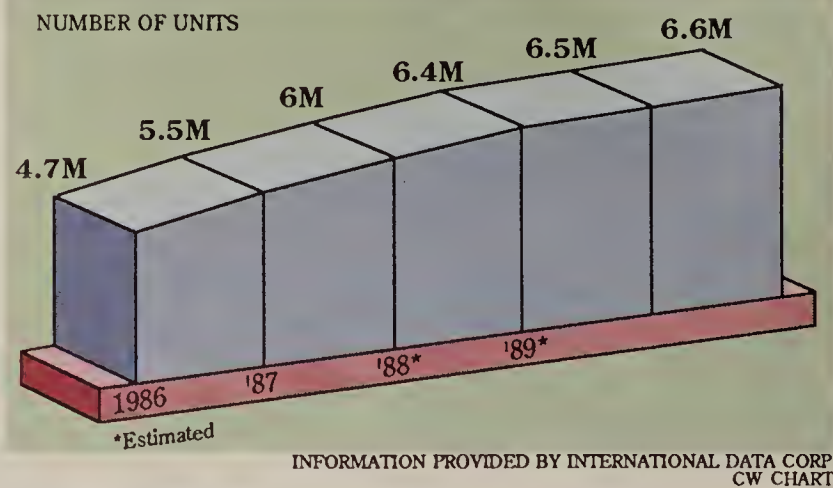
The building blocks will also provide a new indexing system for searching data similar to free-form data bases or information managers. The user would be able to train the system in the way articles are read, and the system could in turn browse for articles or pieces of articles that are of interest.

"My knowledge base can become a common indexing mechanism for a data base," Kapor explained.

Although initially targeted at the Macintosh, the products will later be ported to Microsoft Corp.'s OS/2 Presentation Manager graphical user interface.

Flattening out

U.S. installed base of 8088 PCs is slowly stabilizing



8088s

FROM PAGE 1

ing to find these people for what turns out to be little [monetary] gain," said Mike Heschel, corporate vice-president of information resources at Baxter Healthcare Corp.

One user argues that the charities are better off without a corporation's discarded hardware. "You aren't doing them any favors, because many times you are giving them a piece of junk they don't know how to use, with no software," said Jeff Ehrlich, manager of technology for General Electric Co.'s Information Technology Group. Often, the charities will simply resell the corporate discards.

Other corporations use the older systems as temporary replacements for newer machines being repaired or gut them for spare parts. "We will cannibalize them when we need to for spare parts," said Philip Gordon, a micro manager with Charles Schwab & Co.

Some firms either sell the machines cheaply or give them to employees for work and entertainment at home.

"We feel that if [employees] can give us some bright ideas by working at home even an hour a week, they will pay for that machine time and time again," said Ron Bristol, vice-president of computer science for Travelers Insurance Co.

Next year, shipments of 286-based machines will finally exceed those of the 8088's, forcing corporations to find novel ways to use the older machines. Market research firm International Data Corp. predicted that by 1991, IBM and compatible makers will ship a little more than two million 286-based machines, compared with 400,000 8088- and Intel 8086-based units to the U.S. market.

Indentured servants

Still, some machines, no matter what the clock speed, remain in faithful service if only for economic reasons. Because most companies have put their machines on three- to five-year depreciation schedules, many

8088s will have a higher book value than street price for the next couple of years. So selling them cheaply would mean taking a substantial tax write-off.

Baxter Healthcare's Heschel said his firm has put its PCs, as well as all of its data processing equipment, on a five-year depreciation schedule because of the new tax laws. After three years or so, Heschel said his firm will sell them to employees.

"If, after three years, it has about \$1,000 worth of depreciation on it and the market value is \$2,000, we'll sell it to an employee for between \$1,200 and \$1,500," Heschel said.

The resale price of many used 8088s has remained high. One reason is that users who do not want IBM's Personal System/2 computers are willing to pay extra for an industry-standard 8088, says Cameron Hall, co-founder of the Boston Computer Exchange, a used computer broker. "Since the PS/2 came out, people that would buy the new XT's and AT's can't get them, so they come to us for ones that are used," Hall said.

Production halted

Earlier this year, IBM stopped production on its 8088-based Personal Computers and PC XT's, although the company will continue supporting existing users. An IBM spokesman said the company no longer accepts orders from new users and that the only deliveries of PCs now are backlog orders. However, one value-added reseller said that in the last couple of weeks, IBM released the last of its PCs to value-added resellers.

Hall said there has been active trading on PC XT's the last couple of months among individuals as well as small and medium-size companies. She said these companies will buy and sell up to a half-dozen systems at a time.

At the close of business last week, the average selling price of a dual-disk drive, 8088-based IBM PC with a monochrome monitor was \$750. A 10M-byte XT was selling for \$1,325. An 8088-based Compaq system, which Compaq Computer Corp. discontinued earlier this year, had an average price of \$775.

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FROM PAGE 1

that lower price."

An East Coast data processing center accepted IBM's offer to install a 3090 Model 400E this year and be paid in six months. "We got a fabulous deal from IBM," said one participant in the negotiations. "But we didn't get it until we had been shopping vigorously for a month, looking at picking up a used machine from the leasing companies."

A decisive factor in the deal was the IBM salesman's hint about a 3090 price drop in early 1988, the user said. "We got an indication that there would be a new processor in the February time frame that would lower the price of the 400E and that would make a used machine less valuable for resale."

'Wonderful for customer'

"It's a wonderful world for the customer," said Bob Bardagy, senior vice-president of Comdisco, Inc., a computer lessor. Bardagy said he has heard of customers receiving four- and six-month on-site test allowances (OSTA) "on just about everything you can come up with." A customer does not pay the purchase price on equipment until the end of the OSTA period.

Leasing executives also said they have heard reports of IBM offering up to 30% off list price, volume discount incentives and the promise of an early upgrade to the enhanced F series of 3090s. IBM made no official comment, but a spokesman acknowledged that a six-month deferral of payment on new machines — one of the concessions discussed by Computer Dealers and Lessors Association (CDLA) members — is officially available for first-time buyers of 3090 Models 120E and 150E.

The average asking price for a used 3090 Model 200 is \$3.4 million, which is \$1.1 million less than the list price of a new machine and \$600,000 less than the price just four months ago.

Slip-sliding away

Several factors are contributing to the price drop on IBM 3090 Model 200s, according to Svend Hartmann, president of Computer Merchants, Inc. in Chappaqua, N.Y., and publisher of a noted price guide on IBM equipment.

One reason is the upgrade options. Buyers have been more attracted to used Model 180s, which can be upgraded to 200Es, whereas the Model 200 can only be upgraded to a 300E or 400E. And, Hartmann said, the 200E models are in greater demand than the 300E and 400E models.

In addition, Hartmann said, IBM's one-year warranty on 3090 E models has made them more price-attractive, since the warranty replaces monthly maintenance charges typically incurred by Model 200 owners.

Further, buyers of multiprocessor 3090s (Model 200E and up) gain multiple unit credits under IBM's Volume Procurement Amendment.

Hartmann added that some users who bought Model 200s two years ago may already have depreciated them by up to 60%. Those users can now cash in on their equity and profit by selling their machines at 70% of their original list price. In the deal, they may get a regular or extended on-site test allowance and start depreciating a new machine immediately.

STANLEY GIBSON

If the trend continues into 1988, prices could fall by an additional 10% to 20%, said Harvey Kinzelberg, chief executive officer of The Meridian Group, a leasing company in Deerfield, Ill.

Not out of the ordinary

Other users reported that IBM has been aggressive, but not unusually forceful, in negotiations. "There is nothing out of the ordinary," said one MIS executive at a large insurance company, who added that he has been offered no OSTA longer than three months.

The MIS executive said that when he asked IBM about reports that the company was offering longer OSTAs when it faced strong competition for an account, IBM denied making such offers. But, he added, "I am sure that IBM will do everything it can to make sure someone doesn't install a used machine — by offering to extend OSTAs and allowing IBM Credit Corp. to bid very low lease rates. The biggest competitor leasing companies

have is IBM Credit Corp.; it can lower rates at will."

Leasing companies say IBM is aggressively placing new high-end 3090s in many accounts, booking them as fourth-quarter sales. "IBM is forcing these machines out," The Meridian Group's Kinzelberg said. "They're giving customers incentives to put new machines in, and they're giving them even more incentives to swap old 3090s out. IBM's getting a new machine in the account, and they're laying the problem of the used 3090s on our industry."

In the last two weeks, CDLA members have been meeting separately with IBM Industry Relations representatives, trying to reach an accommodation with IBM. "We expect IBM to be a tough competitor but not an extravagant one," wrote Charles Rogol, president of CSR Technology, Inc. in Boca Raton, Fla., in a personal letter to IBM Chairman John Akers. At week's close, Rogol had received no formal response from Akers.

Monsanto weighs Oracle although DB2's faster

BY CHARLES BABCOCK
CW STAFF

ST. LOUIS — Oracle Corp.'s Oracle relational data base management system is still in the running for installation at Monsanto Co. here despite finishing second to IBM's DB2 in a transaction processing benchmark.

The reason is that Oracle has one major feature DB2 does not — portability across hardware platforms, Monsanto representatives said.

Monsanto's example may represent a broader trend in the large systems market as customers review an increasing array of relational products. In Monsanto's case, speed appears to have been neutralized as an issue, and secondary characteristics are being used to evaluate relational DBMSs. In some instances, Oracle is given the edge in these characteristics.

'Nominal difference'

Monsanto officials refused to reveal the results of the benchmark, saying only that there was "a nominal difference in performance between the two," according to David C. Ficken, a systems programmer at Monsanto Chemical Co., a unit of Monsanto, who helped conduct the benchmark. "Both products performed to our satisfaction," offering subsecond response times to queries from simulated multiple users, he said.

However, sources outside Monsanto said they have been told the benchmark showed that DB2 was slightly faster but consumed more machine resources.

One reason Monsanto is considering Oracle for its mainframe system is that it would like compatible DBMSs across its hardware lines, which include Digital Equipment Corp. VAXs and Hewlett-Packard Co. minicom-

puters, Ficken said.

Monsanto reorganized its chemical company to include several smaller units formerly outside it in January 1986, bringing DEC and HP minicomputers under the umbrella of headquarters' MIS department. The parent company uses IBM mainframes. The chemical unit, also located in St. Louis, uses both mainframes and minicomputers. Oracle is installed on a VAX 8650 at the firm.

"Oracle does an extremely good job of taking away the differences between these machines," Ficken said.

Ficken also said Oracle offers "a more robust implementation of SQL," permitting the use of a SELECT statement that uses a literal constant — a string of characters between quotes. "That's particularly useful in joins, when you want to get back to one of the original tables selected [to update it]," Ficken said. He also cited SQL Forms, an IBM SQL-query formulating tool for end users, and Oracle's QMX, which mimics IBM's Query Management Facility.

Oracle has also apparently lifted the wraps for Monsanto on its development efforts. Ficken said he was aware of Oracle's plan to announce next January a personal computer-based product called 1,2,SQL that will allow data from a mainframe relational data base to be retrieved by an SQL query and plugged into a Lotus Development Corp. 1-2-3 spreadsheet.

Monsanto wants to have a relational DBMS installed on its mainframe by mid-1988, Ficken said.

The application used in the benchmark was modeled after an IBM IMS production application processing 12 different types of transactions against a data base resident on 100M bytes of disk.

Software firms drop while HP gains

BY CLINTON WILDER
CW STAFF

Lackluster business caused two leading mainframe software vendors to report quarterly losses last week, but Hewlett-Packard Co. ended its fiscal year with some positive earnings momentum as sales grew by 18% over year-earlier levels.

Cullinet Software, Inc. and Management Science America, Inc. (MSA) both finished their quarters in the red, although MSA attributed the loss to a major accounting change and continued losses at Ireland-based RTS, which it acquired in 1986.

But Cullinet, which had expected a loss, discouraged analysts by reporting virtually no revenue growth from the previous quarter.

Westwood, Mass.-based Cullinet posted sales of \$49.1 million for its second quarter ended Oct. 31, compared with \$49 million in the quarter ended July 31. The company lost \$5.8 million, or 18 cents per share, compared with a loss of \$6.8 million, or 21 cents per share, one year earlier.

Cullinet said revenue from new software licenses in the U.S. and Canada was down compared with the previous quarter, a potentially disquieting factor as

the company attempts to return to profitability next year.

In a statement, Cullinet Chairman David L. Chapman said license renewals and support fees accounted for 57% of the company's sales, or \$28.1 million. Overseas sales reached 31% of revenue, up significantly from 21% one year earlier.

Chapman reiterated that Cullinet still intends to return to profitability in the quarter ending April 30, 1988.

Change causes loss

Atlanta-based MSA instituted a previously announced change in its financial reporting in the third

quarter ended Sept. 30, resulting in a loss of \$6.6 million for the quarter and a restatement of results for the first nine months. MSA implemented the change in an attempt to lessen the seasonality of its revenue, which has traditionally been heavily weighted toward the fourth quarter. Revenue increased 28% to \$56.7 million.

The cumulative effect of the accounting change on MSA's previous years' business resulted in a one-time charge of \$68 million. The charge was taken against MSA's first-quarter results and will result in a substantial loss for the year.

More positive financial news came from Palo Alto, Calif.-based HP, which posted its best

sales growth of the fiscal year in the fourth quarter ended Oct. 31. Revenue grew 18% from year-earlier levels to \$2.28 billion, while profits jumped 39% to \$218 million, or 85 cents per share.

"The [HP] revenue curve is trending up, and the expense curve is trending down," said John Dean of Montgomery Securities.

For the fiscal year, HP's sales were up 14%, from \$7.1 billion to \$8.09 billion. Most of the growth occurred overseas, where revenue jumped 21% to \$3.97 billion. U.S. sales grew by 8% to \$4.12 billion.

Profits for the year were \$644 million, or \$2.50 per share, up 25% from fiscal 1986.

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Rolm/IBM finds trust isn't built in a day

BY ELISABETH HORWITT
CW STAFF

ANALYSIS

Three years after acquiring Rolm Corp., IBM is finally moving to absorb the private branch exchange (PBX) supplier's service, support and sales organizations into its own as part of its campaign to become a one-source supplier of voice/data networking systems.

But some users wonder whether they will like IBM's new deal better than their old relationships with Rolm. And they question IBM's ability to provide adequate support and maintenance using staff who are not up to speed on the unfamiliar telecommunications turf.

In the last six months, IBM representatives have told a number of major Rolm accounts that they can now go through IBM for all their service and support needs. The promised rewards for making such a move include more flexible contract options and one telephone number to service IBM, Rolm and, eventually, other vendors' equipment.

'Loss of flexibility'

But IBM may have trouble convincing customers — particularly its own — that its corporate culture is synonymous with spontaneity. "We'll see loss of flexibility in terms of negotiation as the IBM style becomes dominant in the Rolm organization," predicted Frank Schoff, director of telecommunications for Tribune Co. in Chicago. "They'll offer broader menus but no choices beyond them."

As an IBM computer installation, Tribune has found that the vendor's salesmen typically "lay out the options and say, 'Pick one,'" Schoff reported. "If you say you want a part of Option A and part of B, they say, 'You didn't understand what we said.'"

One new IBM offering that promises more flexibility, according to Schoff, is the Custom-

er Participation Service Program, which was announced in early October. The program is said to allow customers to take responsibility for certain aspects of equipment maintenance and installation and pay less overall.

"With Rolm, it's been all or nothing, so we and other subscribers look favorably on the idea of unbundled maintenance," Schoff said. While suspecting that each unbundled piece will cost more than the same piece as part of a bundled contract, Schoff expects his firm to cut its overall maintenance costs by "purchasing pieces here and there from IBM" and doing the rest in-house.

An immediate concern expressed by many Rolm customers is how the new regime will affect current service and support levels. "Rolm has really improved its service levels over the past two years — but as Rolm, not as IBM," said Chuck Garrison, system vice-president of telecommunications at the Chicago Board Options Exchange and president of the National

Rolm Users Group. In the past few years, Rolm has hired "both bodies and technical expertise, and we don't want IBM to jeopardize that," Garrison said.

IBM left Rolm's service and support staff virtually autonomous until last March, when the organization became part of IBM's newly created Telecommunications Marketing and Service Group. So far, this has made no real difference in technical service or response time for Garrison's company, he reported, nor has he heard any complaints from Rolm users group members.

Rolm's sales and marketing specialists will still be "independent, specialized and focused on Rolm products for the next three to five years," according to L. Scott Perry, IBM's director of telecommunications systems marketing. "The lion's share of the world still has independent voice and data regimes. Users have been satisfied with Rolm's service and don't want that lost in the morass of Big Blue."

IBM has given minimal addi-

tional training to Rolm service and support people because, Perry said, "Their skills are a critical resource, and we don't want to add to their responsibility."

On the other hand, IBM has had its staffers put in 4,000 student days of telecommunications education this year, mostly in voice/data integration, according to Perry. One way the vendor is using its newly trained PBX experts is to staff Rolm support centers in remote regions that have been serviced until now through third-party distributors.

Rolm customers who have had trouble with their third-party distributors welcome the idea of being able to play them off against competition from IBM, Garrison noted.

No sale

However, IBM's offer of direct support has fallen flat with customers like First Tennessee Bank NA Memphis, which has a "very strong relationship" with its third-party distributors, ac-

cording to Lise Stanford, manager of voice networking. "IBM has offered no price decrease or other incentive to attract us," she explained.

One incentive that IBM is beginning to offer to both holdouts like the Tribune and prospective customers is the promise of one-source systems integration and support for both voice and data systems.

The computer vendor is in the process of reorganizing its engineering staff into regional teams that would include one Rolm engineer and one T1 technician as well as an expert in IBM communications, "so that they can go in and put together a network of distributed systems, local-area networks, hosts and telecommunications," noted Clare Fleig, a research director at International Technology Group in Palo Alto, Calif.

The teams' mission is to "uncover a demand, develop and sell the system — usually a customized combination of data and voice," IBM's Perry explained. IBM would act as the prime contractor, putting together a group of equipment and service subcontractors to supply the right combination of offerings for a given customer, he added.

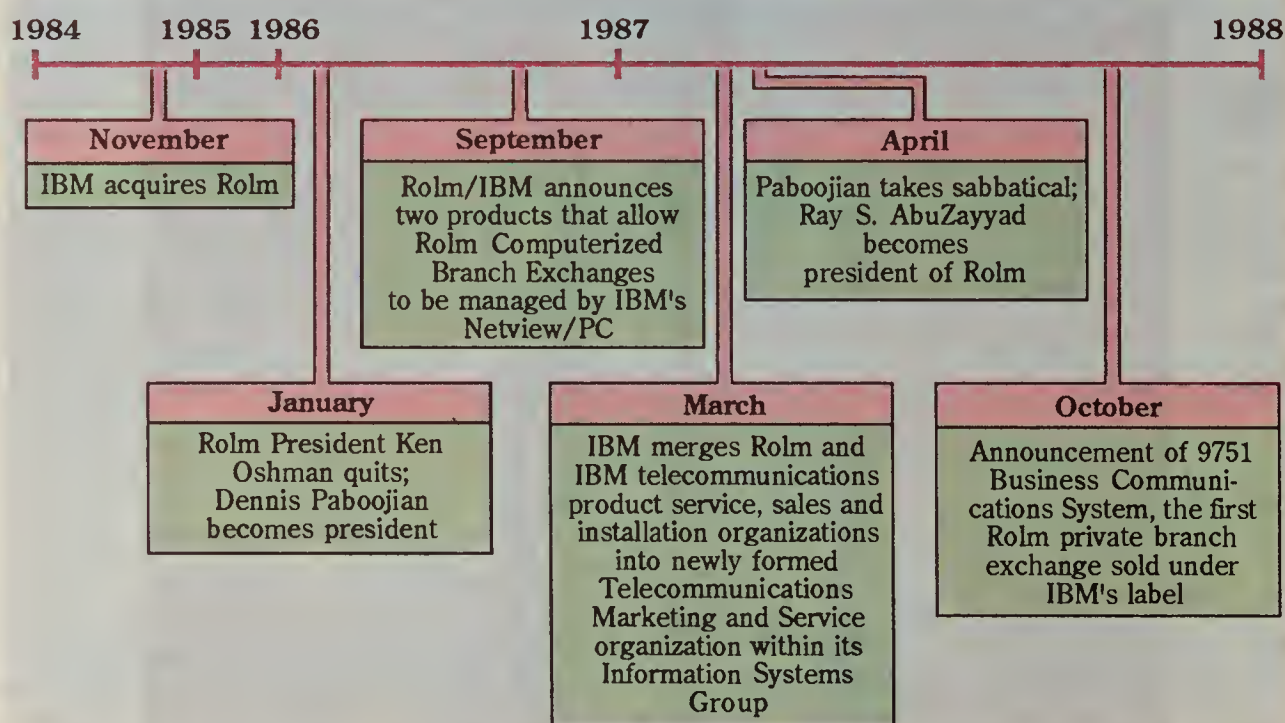
Once the system is designed and installed, IBM plans to provide its customers with a single number to call for servicing a network controller, whether it is for voice or data, Perry explained.

Customers have expressed doubts, however, as to IBM's ability to deliver effective support for the hybrid systems it hopes to sell. "IBM approached us about providing an integrated network, but I think one of the missing links is their support system," First Tennessee Bank's Stanford said.

IBM told Stanford that it would need approximately two years to "ramp up to become totally self-sufficient" in its ability to support comprehensive, multivendor networks, she reported. "Until they address those service and support issues, they haven't a leg to stand on as a full-service telecommunications vendor," Stanford said.

Brief history of Rolm/IBM

Rolm's products, organization beginning to show IBM's influence



INFORMATION PROVIDED BY ROLM CORP. AND IBM
CW CHART

AT&T entices with low-rate carrot

BY ELISABETH HORWITT
CW STAFF

WASHINGTON, D.C. — AT&T dangled substantial long-distance rate cuts in front of its customers last week, hoping to enlist their aid in its battle to get the divested Bell operating companies to lower local-access charges.

The long-distance carrier proposed lowering overall interstate long-distance prices by as much as \$800 million, or 3.6% on the average, beginning Jan. 1.

But AT&T indicated that the amount of the decrease depends on whether or not the local carriers make additional cuts in their proposed access charge rates for 1988. The carriers filed a proposed rate reduction of \$200 million with the Federal Communications Commission Oct. 1.

AT&T is suggesting that the local carriers implement further access rate cuts that would bring the total up to \$800 million, claiming that the Bell operating companies have "vastly underestimated their projection of

long-distance demand for 1988," AT&T spokesman Jim McGann said.

Rating game

Growth in long-distance traffic is a key factor when the operating companies figure out how much to charge the interexchange carriers for access to their local users. AT&T has projected that long-distance traffic will grow by between 13.7% and 18.1% next year, McGann said. The National Exchange Carrier Association, a local carriers' group, is said to

have put the figure at 8%.

"We feel confident that the FCC will lower access charges further by some amount," McGann said. Whatever cuts go through "will be passed dollar for dollar to our customers," he added. If the Bell companies retain their current proposed rate cut of \$200 million, AT&T customers will get the same amount taken off their rates, which would amount to an average decrease of about 1% rather than AT&T's projected 3.6%.

"We certainly share some of AT&T's concerns" about inflated local-access charges, said Brian Moir, counsel for the Interna-

tional Communications Association (ICA). "The Bell operating companies won't cut their access charges unless given the signal by the FCC."

The ICA last week sent comments in response to the carriers' October filings, expressing "serious concerns about whether there have been proper cost allocations" between regulated and deregulated services, Moir said. Also in the ICA's submission to the FCC were comments on "some forecasting issues that need immediate attention," such as whether carriers are realistically predicting future revenues for their services, Moir said.

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PS/2 still not business users' darling

Survey: 73% of micro purchasers remain 'unfamiliar' with hyped series

BY JULIE PITTA
CW STAFF

Despite an advertising blitz, IBM's line of Personal System/2 personal computers has failed to capture the attention of business users, according to a Dataquest, Inc. survey of business professionals responsible for microcomputer purchases and use at their companies.

Slightly more than half (52%) of the 150 business users surveyed said that they have some awareness of the PS/2 computer line.

However, 73% said they are either "not very familiar" or "not familiar at all" with IBM's new line of PCs, the survey showed.

Vague awareness

Of those who professed to have some knowledge of the PS/2, 53.3% said their information is not specific, while another 40% said they have heard "general advertising information" regarding the PS/2, according to the survey.

Only 26.7% said they believe the PS/2 provides higher processing speeds than other PCs on the market, and 10.7% added that they think the PS/2 boasts better graphics capabilities than other existing IBM microcomputers.

Faring even worse in business buyers' perceptions was OS/2, IBM and Microsoft Corp.'s new operating system for mid-range and high-end PS/2s.

Only 39% of those surveyed

said they have heard of the OS/2 operating system. Of those, 70% said that they lack familiarity with the operating system's capabilities.

'Lack of knowledge'

"The most remarkable thing about our findings was the general lack of knowledge about the PS/2 line," said Bill Lempesis, a PC industry analyst for Dataquest. "Even though they may

I THINK IT'S a reflection that people in the industry have the mistaken impression that the end user knows more than he actually does."

BILL LEMPESIS
DATAQUEST, INC.

watch TV and be exposed to other forms of media, their knowledge base of the products is small.

"I think it's a reflection that people in the industry have the mistaken impression that the end user knows more than he actually does," Lempesis added.

Dataquest completed its survey in August, about four months after the PS/2's introduction. Participants work for companies of fewer than 10,000 employees.

The greatest percentage of the respondents — nearly one-

third — work at manufacturing-related companies.

Despite a relative ignorance about the PS/2, business users are not expected to be dissuaded from purchasing it, the survey said.

However, microcomputers from other vendors will likely continue to coexist with IBM's new PCs, according to the research firm's study.

Only 9.5% of those surveyed said they would purchase PS/2s exclusively.

An overwhelming 66.7% said they will purchase PS/2s along with other microcomputers, while 14.3% said they will only buy IBM-compatible PCs, the survey showed.

Success not doubted

"I think the PS/2 will be successful without a doubt," Lempesis maintained. "It will be successful because it's an IBM product, and there's a large block that will buy only IBM.

"But the alternatives are attractive," he continued. "They will continue to sell well."

Significantly, 62% of the respondents said they have IBM-compatible PCs installed at their companies.

Apple Computer, Inc.'s Macintosh is used by 13.3% of the microcomputer installations, and Compaq Computer Corp. PCs were installed at 29.3% of the companies that were surveyed.

Price will represent the primary obstacle to the PS/2's acceptance, but conversion from 5¼- to 3½-in. flexible disk drives will not sway users' purchasing decisions, according to the survey.

The PS/2's smaller footprint will likely prove attractive to business users, as will the line's graphics capabilities, Dataquest concluded.

Excelan links work groups, hosts without gateways

BY PATRICIA KEEFE
CW STAFF

SAN JOSE, Calif. — Excelan, Inc. has shifted its attention from departmental to work group connectivity with the introduction of The LAN Workplace, a line of networking products said to enable users to communicate concurrently with a wide range of dissimilar host and departmental computers — without gateways.

In addition to protecting investments in the installed base of equipment, the products give users the benefits of faster data transfer and access rates because gateways are not required to translate the dissimilar protocols, Excelan claimed.

The LAN Workplace family features a common architecture, which is said to provide concurrency and direct access to network resources from the desktop while allowing users their choice of operating system, applications and servers.

Three-way support

Three industry-standard operating systems are supported: IBM's PC-DOS, AT&T's Unix System V and The Santa Cruz Operation, Inc.'s (SCO) Xenix 386.

Support for IBM's OS/2 and Apple Computer, Inc.'s Finder operating system is slated for release next year, Excelan said.

A typical LAN Workplace configuration, according to Excelan, might link a Novell, Inc. Netware-based network; Digital Equipment Corp., Apple and AT&T Unix work groups; and assorted departmental computers.

The LAN Workplace for PC-DOS is a turnkey package said to enable users on an Ethernet network to communicate with net-

works based on the Transmission Control Protocol/Internet Protocol (TCP/IP).

A user can simultaneously access files or applications on a range of dissimilar computers through government-standard Telnet terminal emulation, the TCP/IP File Transfer Protocol and remote utilities. Access to hosts running server message block protocols is provided through an implementation of Microsoft Corp.'s Microsoft Networks, Excelan said.

Users can select different components of the modular system, including 205T or 205E intelligent Ethernet controller boards, at \$795 and \$695, respectively; Hostaccess, at \$150; Hostshare, at \$100; Driver for Advanced Netware, at \$25; IBM's Netbios, at \$50; and the Socket Library, at \$250.

The LAN Workplace for Xenix provides Netbios and TCP/IP support for systems running SCO's Xenix System V, up to Release 2.2, on Intel Corp. 80386-based computers.

Users of multiple Xenix and Microsoft MS-DOS machines can use remote files and perform other network services, employing the Netbios layer on Excelan's TCP/IP personal host-to-computer terminal emulation or high-speed file transfer applications among dissimilar systems on the network.

A turnkey package costs \$1,395 and includes a 205T intelligent controller.

The LAN Workplace for Unix links 386-based machines running Unix System V Release 3.0 to TCP/IP-based networks. The package includes a variety of utilities and costs \$695. A networking package that includes the software and an intelligent controller board costs \$1,395.

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Olivetti line jumps on mini bandwagon

BY AMIEL KORNEL
IDG NEWS SERVICE

LONDON — Seeking to diminish its dependence on personal computer sales, Ing. C. Olivetti & Co. last week unwrapped a seven-processor family of mini-computers.

The LSX 3005 series is based on the Motorola, Inc. 68000 microprocessor and is compatible with both AT&T's Unix System V and Olivetti's proprietary MOS operating system, company officials said.

The processors in the new line range in power from the 1.5 million instructions per second (MIPS) LSX 3005 for eight users to the 9-MIPS LSX 3080 for

up to 192 users, the company said.

All models are available immediately at prices ranging from \$17,000 to \$500,000, depending on configuration, according to the company.

Competition fierce

Analysts noted that the Olivetti machines will face stiff competition in the already crowded mini-computer market.

The company, on the other hand, said it will reinforce direct sales channels and enhance relationships with value-added resellers and software houses to ensure a large catalog of software applications.

The announcements also

raised questions about Olivetti's relationship with AT&T, which owns 23% of Olivetti.

Until now, Olivetti's mini-computer offering has included AT&T's Unix-based 3B line in addition to its own Line 1, which is based on its MOS architecture, and the CPS 2000, a fault-tolerant superminicomputer that was built by Stratus Computer, Inc. and sold on an OEM basis by Olivetti.

Olivetti officials emphasized that the LSX will be targeted at banking, retail and office automation markets.

The 3B line will continue to be sold mostly to government, scientific and engineering customers, the company said.

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CA	Lafayette	Nov 10
	Los Angeles	Oct 15, Oct 29, Nov 12, Dec 8
	Newport Beach	Oct 6, Dec 15
	Sacramento	Oct 15, Dec 10
	San Diego	Oct 8, Dec 17
	San Francisco	Oct 14, Nov 17, Dec 15
	San Jose	Oct 7, Nov 5, Dec 3
CO	Denver	Oct 15, Nov 12, Dec 15
CT	Hartford (Farm.)	Nov 3, Dec 8
	New Haven	Oct 14, Nov 12
DE	Wilmington	Oct 1
FL	Ft. Lauderdale	Nov 5
	Orlando	Nov 4
GA	Atlanta	Nov 11
	Augusta	Dec 9
IA	Des Moines	Nov 17
ID	Boise	Nov 19
IL	Chicago	Oct 15, Nov 18, Dec 15
	Springfield	Nov 19
IN	Indianapolis	Oct 20, Nov 24, Dec 17
KS	Wichita	Oct 6
LA	Baton Rouge	Oct 22
	New Orleans	Oct 23
MA	Boston	Oct 20, Nov 10, Dec 15
	Burlington	Dec 2
	Springfield	Nov 17
	Worcester	Nov 5
MD	Annapolis	Oct 27
	Baltimore	Oct 8, Dec 17
	Bethesda	Oct 6, Oct 27, Nov 24, Dec 15
ME	Portland	Oct 8
MI	Detroit	Oct 13, Nov 12
	Grand Rapids	Nov 4
	Traverse City	Oct 28
MN	Minneapolis	Oct 29, Nov 18, Dec 10
MO	Kansas City	Nov 10
	St. Louis	Oct 13, Nov 10, Dec 9
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	Buffalo	Dec 3
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	New York City	Oct 7, Oct 21, Nov 4, Nov 10, Dec 2, Dec 17
	Rochester	Oct 22, Nov 18, Dec 17
	Syracuse	Oct 15
OH	Cincinnati	Oct 1, Dec 9
	Cleveland	Oct 15, Nov 12
	Columbus	Dec 8
	Dayton	Oct 20, Nov 17
OK	Oklahoma City	Nov 17
	Tulsa	Oct 20, Dec 8
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	Memphis	Oct 14, Dec 10
	Nashville	Oct 21
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	Dallas	Oct 6, Nov 4, Dec 9
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WA	Seattle	Oct 15, Nov 10, Dec 8
WI	Madison	Nov 12
	Milwaukee	Oct 14, Dec 3

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Which lets you connect seamlessly to DEC's VAX, IBM mainframes, and other popular systems. And by putting Macintosh at the front end, you give people a more civilized way to deal with mainframes.

Another revelation is the wide array of innovative Macintosh business applications—financial analysis, word processing, databases, and, of course, graphics. Which are not only easier to learn than what's running elsewhere, but more advanced.

The point-and-click simplicity of the Macintosh graphic interface is a well known boon for the user.

But it also turns out to be a major time and money saver for you who have to train all those users. Because Macintosh has a lower training cost per desktop than any MS-DOS computer on the market.

Macintosh's simple, straightforward oper-

ating style also pays off impressively after the training is over.

In an in-depth analysis of 7 Macintosh installations in business, users consistently reported productivity gains of 15 to 25% and more.

And on top of all this, Macintosh has excellent connections.

While others are pushing the "network of the Near Future," the Macintosh network is here and now. It's called AppleTalk®.

AppleTalk is a networking protocol that is at the same time sophisticated, infinitely flexible, easy to set up. And meets ISO standards.

You can link the system together just about any way you want to—over phone lines, twisted pair, fiber optics or Ethernet.

Plug in a card and you can run AT&T UNIX® as well as MS-DOS applications. And in fact, there are a variety of other ways to integrate Macintosh into the MS-DOS world.

Including the AppleShare™ file server which lets Macintosh and PC's link and share data.

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Most systems held fast while storm clouds grew on Wall St.

BY ALAN ALPER
CW STAFF

NEW YORK — Computer systems at financial institutions were largely able to handle the record volume of stocks traded worldwide on so-called "Black Monday," according to a study released last week by the Coopers & Lybrand accounting firm.

Data on the impact of the massive decline in the world's stock markets on Oct. 19 was collected from 23 of 45 international financial industry executives surveyed for the report, which detailed the effects of global, 24-hour trading on financial institutions worldwide. Information about computer loads was included as an addendum to the main report, which was prepared before the crash.

"The comment by most people was that they were surprised their systems could handle the volume on a day when 600 million-plus shares were traded in the U.S. and the equivalent overseas," said Lawrence Willis, a partner within Coopers & Lybrand's management consulting services group. "Most of the problems experienced that day concerned the front end of the communications link, like reaching someone on the telephone."

In fact, many of the financial industry executives surveyed said they believe that the continuing volatility of worldwide stock markets will lead to an increase in systems development and technology deployment. For example, some financial services firms expect to increase reliance on decision-support systems to attenuate risks involved with options trading and arbitrage. Decision-support systems could also be used to maximize the tax advantages of trading in markets where different laws apply, Willis said.

Computer and communications technology will also be leveraged to clear and

settle international stock trades more effectively. "The way things are done now, many phone calls are made at the end of the day to and from overseas branches to settle the books," Willis said. "One system to clear trades made across the globe is something the industry is looking for."

Despite a widely held notion that program trading contributes to the volatility of the world's stock markets, the Coopers & Lybrand study found that few of the institutions queried have the capability to invoke computerized trades. However, 89% of the firms questioned said they expect to have program trading capabilities within five years.

"Program trading has gotten a lot of publicity in the U.S., but places like the UK and Japan have yet to adopt it," Willis said.

The majority of the 45 financial services industry executives surveyed contended that an integrated global information network is a prerequisite for financial services companies participating in worldwide 24-hour trading. Yet only 16% of those surveyed said they had integrated their information network; 47% said they had made successful strides, and 33% said they had not made significant inroads.

Most said prohibitive costs — not technology — limited their integration efforts. Many pointed to the adoption over the years of incompatible systems at various company locales as a factor that contributed to high integration costs.

Not having a high-level executive plan was also viewed as a hindrance by those surveyed. "Most companies have an executive in charge of technology, but few have been allowed to carry out the charter," Willis said. "There's a big difference between giving someone the title and actually letting them do the job."

Chip makers to trim ranks

National Semiconductor, AMD will each let 500 workers go

BY JAMES A. MARTIN
CW STAFF

Two of Silicon Valley's biggest chip makers, National Semiconductor Corp. and Advanced Micro Devices, Inc. (AMD) last week announced plans to lay off about 500 workers each.

The layoffs are a result of business consolidations and reorganizations particular to each company and do not portend a new downward spiral in the semiconductor industry, analysts said.

However, observers admitted that the October stock market plunge could have a negative impact on the electronics industry in 1988.

AMD said last week it will trim research and development spending, specifically in the area of random-access memory, by \$10 million per quarter, creating the need to cut staff in January. AMD has been grappling with production costs and expenses since its acquisition of Monolithic Memories, Inc. and recently reported a second-quarter loss of \$40.9 million.

RAM products take backseat

AMD said it will immediately discontinue any further development of RAM products, except for those required by its joint agreement with Sony Corp.

In addition, AMD will discontinue research and development activities in bipolar and CMOS technologies in its RAM program, according to a company statement.

"Only a company with an exceptionally strong technical superiority can compete with Japan in the RAM market, and most finally have come to realize it's a losing battle," said Ming Li, a semiconductor analyst for L. F. Rothschild & Co., referring to Japan's RAM chip dumping in the U.S.

Still committed to EPROM

AMD stressed, however, that it will not abandon current RAM customers and said the company remains committed to erasable programmable read-only memory (EPROM) circuits. EPROM will replace RAM as the drivers for bipolar and CMOS technologies, according to a company spokesman.

National Semiconductor's dismissal of 500 employees worldwide comes shortly after a similar layoff of 400 workers [CW, Nov. 2]. Both are said to be related to the firm's recent acquisition of Fairchild Semiconductor Corp.

The company said the latest move would be the final transition reduction. National Semiconductor's worldwide employment is now less than 38,000.

IBM iron to adopt Fujitsu software

BY LORI VALIGRA
IDG NEWS SERVICE

TOKYO — Less than two months after signing an arbitrated settlement that gives Fujitsu Ltd. access to IBM source code, IBM Japan Ltd. said it has developed a program to make its mainframes compatible with Fujitsu software.

IBM Japan's protocol conversion operating system, VM/MP II, works with IBM's MVS/XA operating system and runs Fujitsu applications on IBM 4381 mainframes.

IBM Japan spokesman Mac Jeffery acknowledged that the VM/MP II conversion operating system is aimed at getting Fujitsu OS IV/F4 MSP E20 users to migrate to MVS/XA systems.

IBM introduced a similar program protocol conversion for Hitachi Ltd. mainframes this summer.

Once VM/MP II is altered for a user's configuration, the 4381 can run a wide range of Fujitsu programs developed for OS IV/F4 MSP. That operating system is Fujitsu's best performer, running on the company's M series mainframes and VP series supercomputers, which also run IBM's MVS.

OS IV/F4 MSP applications include a data base management system, a graphics report generator, an information retrieval system, a management decision-support system, a simulation language, math programs and an interactive mapping system. There are also support programs for computer-aided design and manufacturing, Korean processing and videotex.

The potential for IBM to sway customers with such products is considerable. In a recent poll of 2,364 customers, K. K. Ashisuto, the largest software distributor to large corporations in Japan, found that IBM's MVS ran on 29% of the primary computer systems installed at customer sites. Fujitsu's OS IV/F4 MSP ran on 15%, and Hitachi's VOS ran on 12%. With its compatible operating systems, IBM Japan has effectively doubled its target market.

THIS is the first major move IBM Japan has made to nip back at its competitors, whose newfound aggressiveness is proving fruitful.

Bill Totten, president of Ashisuto, which distributes in Japan for firms such as Applied Data Research, Inc., Computer Associates International, Inc. and Management Science America, Inc., said there is a strong demand for software that runs across the major manufacturers' main-

frames.

This is the first major move IBM Japan has made to nip back at its competitors, whose newfound aggressiveness is proving fruitful. Fujitsu, especially, has been nibbling into IBM's replacement mainframe market recently. And with the settlement of its battle with IBM, Fujitsu can now assure its customers that its compatible business has a future.

Fujitsu spokeswoman Yuri Momomoto emphasized that she is not concerned about IBM Japan's new strategy because her company has software laden with Japanese market features. She pointed out that competition between the two companies will take place mainly in Japan because the machines run Japanese Kanji programs.

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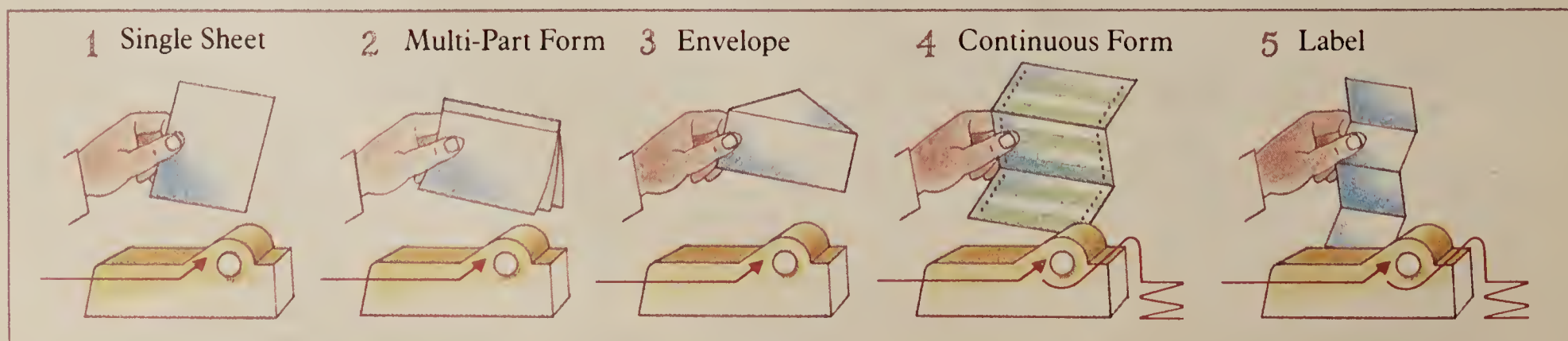
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EDITORIAL

Alive and well

THE INTRODUCTION of the next generation of microcomputer operating systems and the jazzy, 32-bit platforms that will support them has fueled the debate over the fate of mainframes.

This debate is being played out not only in trade journals and the business press but also at the MIS planning table. Strategists there, who traditionally fed long-term needs with big-iron acquisitions, are being confronted by a vocal minority that insists that multibillion-dollar companies will be run solely — and successfully — on personal computers, possibly within the life of current long-term plans.

So what's the answer? Is the trend of declining mainframe sales of the last three years doomed to continue indefinitely, to the point where the few remaining big boxes are relegated to menial, mass file-serving roles? Is it possible to exploit a difference of 50-to-1 in the cost per million instructions per second on a mainframe vs. that cost on a PC — to the point where mainframes are virtually obsolete?

This much is assured: MIS will continue to spend the greatest portion of new equipment outlays on PCs and PC-related products. Managing end-user computing will emerge as the single greatest challenge to MIS. And advances in PC products will make available to MIS a wider array of low-cost solutions based on microprocessor technology.

But it is extremely shortsighted, not to mention dangerous to the information systems planning process, to assume that we'll witness the imminent demise of mainframes. It certainly will not happen in this century.

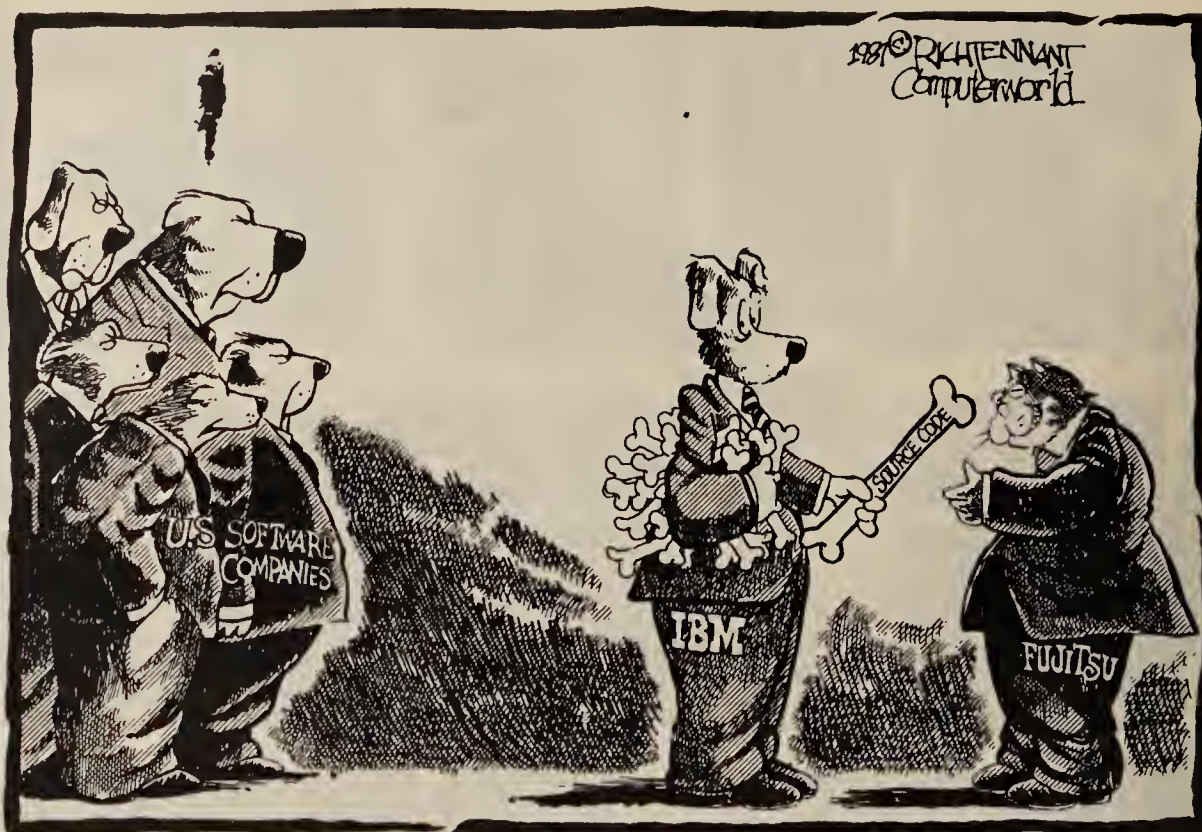
With the broad and growing gap between the cost of MIPS on a mainframe and a micro, how can we be so sure of this scenario?

Consider that the most widely used business PCs today are driven by the Intel 80286 chip. But only recently, four and a half years after the introduction of that chip, do we have an operating system that begins to exploit the full potential of those machines. And applications are lagging even further.

Consider, too, that MIPS on a PC is hardly equivalent to MIPS on a bigger machine, whose complex internal architecture gives a mainframe disk I/O potential that a PC or an array of PCs cannot begin to match on a MIPS-for-MIPS basis.

Last, consider that mainframe and minicomputer technology has hardly stood still. The power and much of the functionality of mainframes 20 years ago are available on today's desktop workstations, and mainframes are still alive and well, with \$10 billion worth sold this year in the U.S. alone. And we haven't begun to feel the tremendous overhead that Integrated Systems Digital Network will place on mainframe resources.

To steal a phrase from Mark Twain, it seems that early reports of the mainframe's death are exaggerated.



LETTERS TO THE EDITOR

Blame economics

Although Fred Viskovich made some interesting points about the abilities of the IBM Personal System/2 product line in "What threatens mainframe computing?" [CW, Oct. 19], it seems to me that he spent a lot of time and effort trying to establish with unfounded accusations that a conspiracy exists among MIS directors, managers and systems programmers to perpetuate the use of mainframes.

I would like to suggest another reason why mainframes are not being quickly abandoned in large numbers in favor of state-of-the-art personal computers: economics.

Few boards of directors faced with today's economic climate would approve the abandonment of a sizable investment in mainframe hardware, software and personnel coupled with the sizable additional expenditure necessary to acquire the PC hardware, software, training and extra staff to redesign all corporate systems from the ground up.

I wish Viskovich had at least somewhat dealt with the problem of how to best convert a mainframe shop into a PC-based distributed data processing environment.

I suggest that what Viskovich envisioned as a conspiracy to perpetuate mainframes may, on careful examination, turn out to be the result of corporate officers and boards of directors trying to be conscientious while managing their stockholders' investment.

Dick Kuban
Information Systems Specialist
Colorado-Ute Electric
Association, Inc.
Montrose, Colo.

Shaken faith

I rely on *Computerworld* for accurate reporting, but the article on Apple Computer, Inc.'s Hypercard program, "Corporate users give Hypercard thumbs-up" [CW, Oct. 19], has shaken my faith.

Taking at face value H. J. Heinz Co.'s Steven Morelli's "wish list" that Hypercard would be enhanced to allow import of data from other applications, the reporter expanded by stating that Apple would need "to release Hypercard code in the public domain" and implied that Apple has developed Hypercard at the expense of third-party developers.

In fact, Hypercard can easily import data from third-party applications.

This week
in history

Nov. 14, 1977

The New York State Tax Commission rules that both proprietary and custom software are intangible and therefore not subject to state sales tax.

Nov. 22, 1982

The Federal Bureau of Investigation is crediting its extensive data base with compiling its best record yet for criminal investigations and prosecutions. The newer data bases — which were first set up in 1978 — are also credited with the "elimination" of several organized crime families.

By means of a simple script that opens the file to be imported, reads that file and then closes the file, any data, delimited by commas, tabs or any other character, can be used by Hypercard.

Hypercard is an extraordinary program. It is not perfect — its report capabilities are abysmal — but to criticize the program for lacking a feature it does support is highly misleading at best and irresponsible at worst.

Susan Stevens
Owner
Computer Instruction
Synder, N.Y.

A word for auditors

I know many data processing departments read *Computerworld* religiously. In future issues, I would like to see an article or two on electronic data processing (EDP) auditing (please stop the booing). It is a constant struggle to convince people that auditors are not "out to get them" and that we simply want to protect the assets of the corporation for the good of all.

If your publication could present a few articles or, better yet, a regular feature (fat chance, right?), it would benefit not only EDP audit practitioners but also those in the DP world who generally do not know the purpose of EDP auditing.

William E. Hooper
CISA
Columbia Savings Association

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor, Computerworld, P.O. Box 9171, 375 Condituate Road, Framingham, Mass. 01701.

Spying a bull in bear's clothing

The stock crash may be a bitter pill, but it will improve the industry's health

FREDERIC WITHINGTON



The crash in the prices of computer stocks will prove a blessing in disguise. The last crash was, and this one has even more positive aspects.

The last crash happened in 1970. The market as a whole was not down as much as this year, but computer stocks were down more in comparison.

During the 1960s, the computer industry blew a big speculative bubble. By 1969, price/earning ratios were often more than 100; some were even infinite because it was fashionable to start new companies in minicomputers, leasing or time-sharing and go public immediately without a product, much less any earnings.

Even established companies had inflated multiples. The conventional wisdom about IBM was, "Buy IBM whenever its price/earnings ratio drops to 50." IBM's ratio is now 16; before the crash, it was no higher than 24.

The industry's revenue was flat in 1970, and stock prices tumbled. The weak companies went to the wall. The ranks of leasing companies, for instance, shrank by more than half. Other areas of carnage were the plug-compatible peripherals, time-sharing service bureaus and minicomputers.

User companies, too, were affected by the crash, some even more than the computer companies because the overall market was hit again in 1974 and much more seriously than it had been in 1970.

There were cutbacks, of course. The kinds of projects most affected were those with the least productivity impact: in-house time-sharing systems, business minicomputers (sold without software in those days) and early office automation systems.

The solid projects were continued, however. The early years of the 1970s was the great growth period for interactive data entry, for real-time inquiry systems and for engineering minicomputers. The strong vendors survived, and it was even

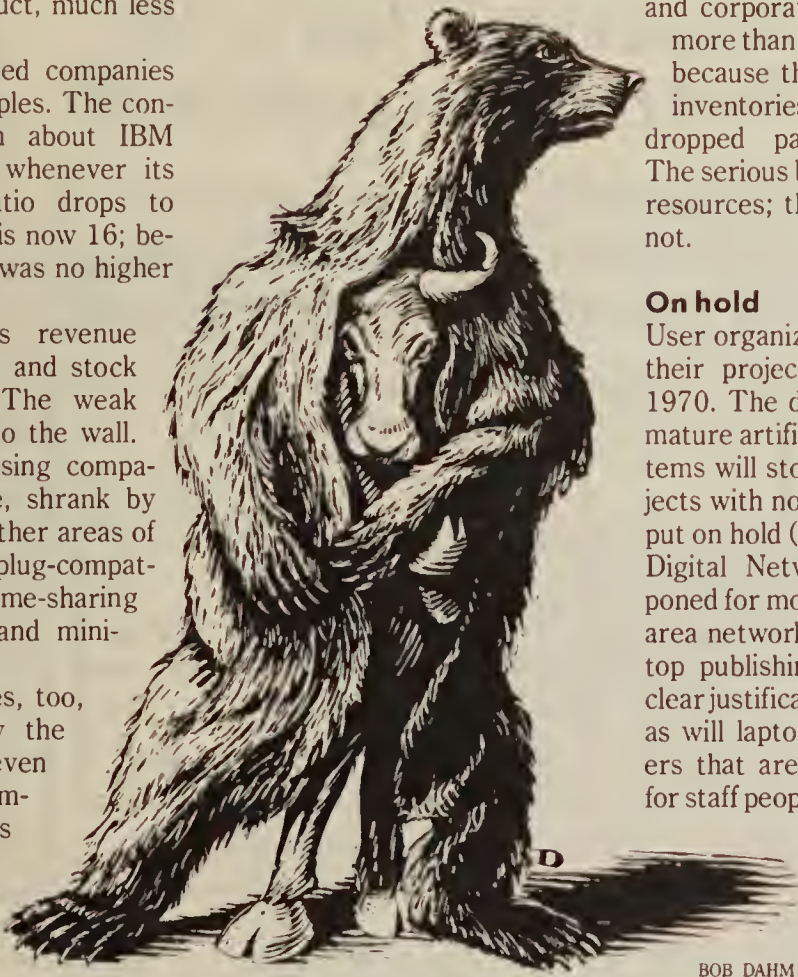
A 30-year veteran of the computer industry, Withington was a vice-president at Arthur D. Little, Inc. and is now an independent consultant. He has written four books and more than 60 articles and papers.

possible for new startups to grow. Wang Laboratories, Inc. and Data General Corp. achieved their first significant growth during this period of market weakness.

Focused resources

The upshot is that the industry shrugged off its one flat year (1970) and spurred ahead faster than ever; industry revenue in 1975 doubled that of 1970. The crash had forced vendors and users alike to look hard at their priorities and focus scarce monetary and people resources on the high-payoff projects. The industry probably grew faster than it would have without the crash, because fewer scarce resources were squandered on impractical projects.

I think the same thing will



BOB DAHM

happen again. Industry stock prices are oscillating around a level about two-thirds off their peak, and there's no sign of panic except on Wall Street. (If they resume falling to below one-half, I'll think again.) Interest rates are lower and will remain so: The loss of a trillion paper dollars in stock values enables the Federal Reserve Bank to provide more money without the fear of kindling inflation. Small companies with good collateral will be able to borrow more cheaply.

Finding funding

Despite the crash, most of the venture capitalists who fund the new startups are still in business. Most of them do not have to sell existing investments before making new ones. They are fueled by a steady stream of dividends, interest and contribu-

tions (to pension funds, for example); really attractive new startups are still likely to find funding.

Foreign investment is a new source of funding that was insignificant in the 1970s. The U.S. dollar was still dropping weeks after the initial market crash, and U.S. stocks have now dropped more than those in West Germany and Japan.

A wave of partnerships, joint ventures and acquisitions in the U.S. had already been growing before the crash. It will almost surely accelerate. Maybe this pattern is not all to the good, but at least it means more investment in U.S. industry and more jobs here.

At the same time, the pace of hostile takeovers and buy outs will decrease. The arbitrageurs and corporate raiders were hit more than anyone by the crash because their junk bonds and inventories of takeover stocks dropped particularly sharply. The serious buyers will still have resources; the greedy ones will not.

On hold

User organizations will cut back their projects, as they did in 1970. The development of premature artificial intelligence systems will stop. Networking projects with no clear payoff will be put on hold (Integrated Services Digital Network can be postponed for most everybody; local-area networks for many). Desktop publishing systems lacking clear justification will be delayed, as will laptop personal computers that are only conveniences for staff people.

But the productivity-enhancers will still be pursued by most user organizations.

Many users are several years into the transformation of their systems that will integrate operational data bases with tactical decision-making or support interindustry electronic data interchange or permit manufacturing operations to run both better and leaner.

Such users aren't likely to stop these efforts unless times get much harder. They didn't in the 1970s, and they've said they won't now: Post-crash surveys show no significant reduction in plans for capital investment.

So, the crash is likely to prove a blessing. The superficial and unjustified will be weeded out, and well-justified projects and startups will find more support, if anything. A little dose of harsh economic medicine is sometimes beneficial in the world of high-tech: grin and swallow it.

Information centers: Evolving to survive

SHAKU ATRE



Most aspects of the computer industry are more evolutionary than revolutionary. The information

center is no exception. It embodies end users' direct access to various sizes of computers, but predominantly to micros.

However, if micro training is considered its only mission in life, the information center could become a training backwater. Eventually, it would be absorbed either by the corporate training department or the human resources department.

What should the information center evolve into? Maybe a business expert center.

The critical success factors of an information center from the end users' perspective have been troubleshooting, consulting in problem solving and then training. Many organizations lack a specific career path for information center staff. As a result, interesting people were not interested in joining the information center or staying there. And without technically capable staff, end users knew more about the hardware and software products than the information center consultants.

A consultant is asked to solve different problems every day. Focusing predominantly on the training area is an easy pattern to slip into. But information centers that consider training to be their major responsibility have a difficult time justifying their futures.

Fighting fires

Now is the time for information centers to prove they are worth the expense. They should be proactive rather than reactive. They become reactive by just fighting fires when they ought to be initiating action.

To do that, information center managers ought to be out exploring new technologies — particularly expert systems — because the information center staff is the mediator between the MIS people, who possess the computer tools, and the end users, who have the business expertise.

Information center managers

Atre is president of Rye, N.Y.-based Atre International Consultants, Inc., a company that provides consulting and training in data base use and information center administration. She has written a book on information centers entitled *Information Center: Strategies and Case Studies*.

ought to be able to put the two groups together for synergistic results, which means, by the way, that the managers must develop both business and technical skills. In the first wave of staffing, many information center advisers didn't pay much attention to developing technical skills. They were mostly people-oriented.

But now, the information center adviser must develop technical skills as well. What types of applications should then be supported by the information center staff? Two major categories of applications are prompt-answer systems and organizational support systems.

The prompt-answer systems are more suited for decision making on a one-time basis as well as on a regular one. The major criterion is its sense of urgency,

INFORMATION centers that consider training to be their major responsibility have a difficult time justifying their futures.

cy, which represents the major characteristic of a decision support system.

As far as the organizational support systems are concerned, organizational productivity must be increased, and performance of daily business tasks must be improved. But an information center that is destined to succeed as the needs of the business change should be a business expert center.

One of the major roles of a business expert center is to preserve the knowledge of the experts who, in a majority of the cases, are the end users. An expert system is a computer program or a set of programs that use human traits such as logic to solve problems.

With an expert system, an information center adviser should try to build a knowledge base of end users for better decisions. An expert system should try to mimic the right-hand side of the brain. Our computer systems have tried to imitate the left side, which works much better with quantities or numbers, whereas the right side of the brain works much better with inferences.

An information center — or a business expert center — should evolve into trying to put the end user and the computerized tools together. With this trait, they will be able to show that they are more proactive than reactive.

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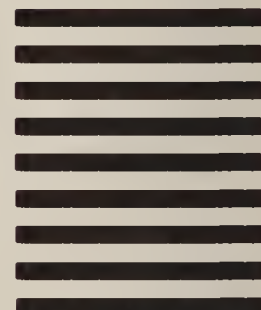
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SOFTWARE & SERVICES

SOFT TALK

William Inmon

CASE no cure-all



If there is one generic fault to the computer industry, it is its constant search for panaceas.

Once, the industry thought not using GOTO statements would solve our problems. Then there was the day when data dictionary was the answer. Somewhere along the line, relational data bases were the answer. Now, computer-aided software engineering (CASE) is in vogue.

Like lemmings that inexorably run to the sea, once more we are mistaking tools for solutions. CASE, in any form, is a tool, not a solution. Those who know what they are doing will be able to use CASE and reap the rewards of productivity. Those who do not will only prove it more quickly with CASE.

What is needed to turn CASE from a tool into a solution? Underlying CASE's successful use is the assumption of a methodology. The methodology may be formal or informal, but nevertheless it must be there. And the effective use of CASE is no better than the methodology underlying the tool.

Formal methodologies do not have a sterling record. Most formal methodologies are cumbersome, expensive and gather a lot of dust. They generate spurious paperwork that may or may not have a bearing on the reality of developing a system. Some methodologies have a

Continued on page 25

VAX users going DBMS-less

No need, low budgets cited as top reasons; software houses' eyes light up

BY ROSEMARY HAMILTON
CW STAFF

The bulk of Digital Equipment Corp. VAX users do not run data base management systems, according to a recent report by Computer Intelligence, a market research firm in La Jolla, Calif.

Nearly 75% of the 11,000 VAX sites that Computer Intelligence tracks said they do not use DBMSs because they either do not have a need for sophisticated data management tools or do not have the budget to make such a purchase, the research firm said.

Computer Intelligence maintains a data base of 11,000 VAX

sites and updates these files at a rate of 1,600 calls per month.

This will likely translate to good news for many of the major software houses, like Cullinet Software, Inc., that have made a big push for the VAX market recently. Among those users running a DBMS, 25% are using a packaged product while 2% are running a homegrown system.

Within the segment of users who have purchased DBMSs, 37% are using DEC's data management software, including its relational product, RDB.

Archrivals Oracle Corp. and Relational Technology, Inc. have almost equal shares of these us-

ers, with Oracle represented in 18% of them and Relational Technology accounting for 17%.

Computer Intelligence reported that it initially assumed the large group of non-DBMS users were managing data with other tools, such as a fourth-generation language product or a report generation package with built-in data management features. However, the firm found the opposite to be true.

The non-DBMS sites are less likely than the DBMS sites to use fourth-generation languages and report generators. Overall, Computer Intelligence said,

Continued on page 25

Trying to maintain a good image

BY CHARLES BABCOCK
CW STAFF

ARLINGTON, Va. — The most important part of existing systems are the people who maintain them, but few companies manage their software assets as if this were true, claimed Ed Drouin, director of data processing training at Liberty Mutual Insurance Group.

Speaking at the Data Processing Management Association's fifth annual software maintenance conference here, Drouin said software maintainers are viewed as unimaginative programmers with little ambition, a view that in part reflects the tenor of the name of their profession. "Why isn't it called software enhancement or support?" Drouin asked.

Drouin said he faced an uphill battle when he attempted to upgrade the status of maintenance programmers in his company. One manager insisted that people hired for maintenance should have limited education because the job was "not too demanding" and he did not want people getting frustrated.

With eight million lines of Cobol and PL/I code in 430 systems at its Portsmouth, N.H., data

Continued on page 25

Users, vendors share blame for glitches

BY CHARLES BABCOCK
CW STAFF

MOUNTAIN VIEW, Calif. — Software interruptions are often

attributed to the misuse or abuse of software by the user, but software vendors contribute to this misuse by providing poor training services and documentation,

according to a study soon to be published by Input.

The market research firm, based here, surveyed 302 customers of 10 major application vendors on support issues to reach its conclusions. Those surveyed included customers of Cullinet Software, Inc., McCormack & Dodge Corp., Digital Equipment Corp., IBM and Management Science America, Inc.

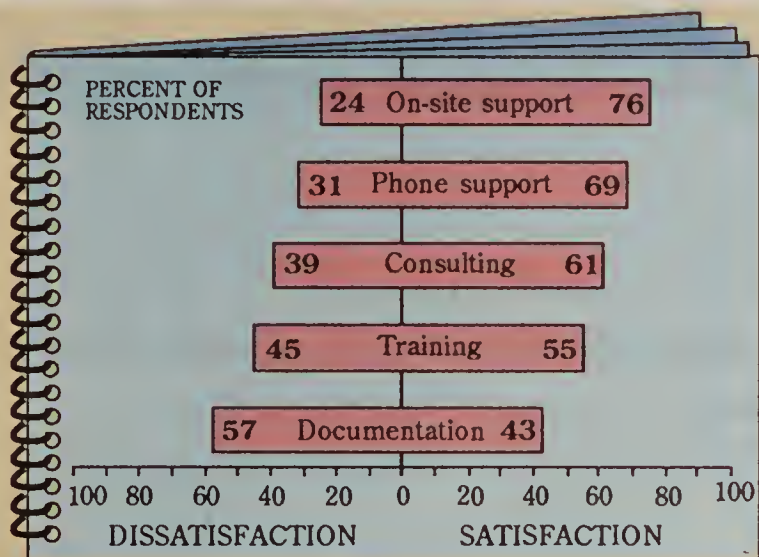
With the increasing reliability of hardware, software problems account for 30% of all large system interruptions and 20% of small system interruptions, according to the report. The quick availability of support in response to software problems is an increasingly important factor in software purchase decisions, it said.

Of those surveyed, 66% indicated that they received contractual support by phone or a hot line service vs. 31% who said they contracted for on-site sup-

Continued on page 25

Documented dissatisfaction

Documentation scores lowest on support list in survey of users of major vendors' products



INFORMATION PROVIDED BY INPUT
CW CHART

Inside

- IBM to link VM/SE, CASE products. Page 24.
- Cincom upgrades Mantis for IMS/DC users. Page 24.
- Xerox designs manufacturing software system for System/38. Page 28.

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IBM linking VM/SE to other CASE products

IBM plans to link its software engineering product for VM-based systems to other vendors' computer-aided software engineering (CASE) products, a company spokesman said last week.

An interface that would link IBM's VM/Software Engineering (SE) to Cadre Technologies, Inc.'s software development product, Teamwork, is currently under development, the IBM spokesman said.

A prototype of the Cadre link was recently demonstrated, but the product is not yet generally available. The IBM spokesman would not provide an availability date for the product.

VM/SE is intended to be the traffic cop and manager of a software engineering project. It runs on mid-range IBM hardware, including 9370s or the 4300 series, under IBM's VM operating system.

Well-suited for small mainframes

The spokesman said the product is suited to run on small mainframes, such as the 9370, to which personal computers or workstations, such as the IBM RT Personal Computer, would be linked via either Ethernet or IBM's Token-Ring network.

With the interface, VM/SE would serve as the central repository of the de-

sign data and also provide project management functions. Meanwhile, users on PCs would be involved in the actual design work and would rely on the data stored on the 9370.

In the case of the Cadre Technologies product, which runs on the RT PC, the interface would allow Teamwork users to directly access VM/SE while in the Teamwork environment.

Counting Teamwork

In addition, Teamwork design specifications and analysis work can be sent to VM/SE, where they will be stored and maintained.

Ultimately, users running a variety of different CASE tools could share data through VM/SE, the IBM spokesman said.

VM/SE was first introduced in 1986 and was upgraded to a program offering this past July. It is now offered as one of IBM's Solutionpacs.

Its central storage component will house source code and documentation pertaining to a project. VM/SE is able to manage relationships between objects and will accept data base queries, the company said. It also provides authorization control for all members of a project team.

VM/SE, which IBM has priced on the graduated charges scheme, starts at \$16,000.

Cincom upgrades Mantis for IBM IMS/DC users

CINCINNATI — Cincom Systems, Inc. has upgraded its Mantis offering for IBM IMS/DC users to bring it in line with its Mantis offering for IBM CICS users.

Mantis is an applications development environment that works with data base management systems from Cincom and other vendors. Both IMS/DC and CICS are teleprocessing monitors, although CICS is by far the most widely used in the industry.

Mantis Release 4.2.5 for IMS/DC users, which is available now, is an improved version of the first release for IMS/DC users, which came out in 1986.

Supports MVS/XA

Release 4.2.5 offers a series of new features as well as support for the IBM MVS/XA operating system.

For development work, full-screen program development and a logical terminal interface are available in Release 4.2.5.

The logical terminal interface allows users to design screens and reports without regard to the characteristics of the terminal in use. Designs as large as 255 rows by 255 columns can be created.

Release 4.2.5 also has additional programming verbs and commands, which will reportedly cut down the programming time for writing applications.

Among Mantis for IMS/DC users are Lloyds Bank PLC and Rolls Royce Ltd. in the UK, according to a Cincom spokesman. Total Mantis users number approximately 2,800, he added.

Mantis Release 4.2.5 ranges in price from \$15,000 to \$150,000 for IBM hardware.

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Maintain

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processing facility, Liberty Mutual needed to make a bigger investment in the pride and status of its maintenance staff, he said.

In thinking about the issue, Drouin said he found a description of what makes a good maintenance programmer by Girish Parikh, one of a handful of authors on software maintenance.

Parikh said maintenance programmers need the flexibility to interpret someone else's coding because they frequently modify programs that were developed by someone who has since left the company. They need patience to answer those middle-of-the-night calls to fix a program that has blown up, he said.

In addition, they need a high sense of responsibility for the extensive systems under their care, and it helps if they have a broad background so they can quickly grasp changing business requirements and incorporate them into existing systems. And, contrary to common belief, they need to be innovative enough to find a suitable structure for systems that are frequently unstructured, Drouin recounted.

Intrigued by this description, Drouin asked two dozen of his

maintenance programmers why they liked their work. The answers included the following:

- They were working within definite boundaries. Guidelines and procedures are clearly set. The scope of maintenance projects is usually well-defined, unlike development projects.
- The programmer has more control over the code in a maintenance environment than in a development environment, in which the analyst may reign supreme.
- Trouble-shooting is interesting. When told the system had bombed and there was no documentation, some maintenance programmers said, "Great, let me at it. Who knows what I'll find."

Frustrations cited included an uneven work load, the hazard of working on systems that might crash because of only small changes, and the fact that the better the maintenance programmer does his job, the less visible he becomes in solving a crisis.

Maintenance programmers also tend to be frustrated by the fact that they are seldom exposed to new technology, and sometimes get turned down for promotion because they lack experience with the latest innovations, Drouin found.

Inmon

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strong orientation toward batch systems; some have an orientation toward on-line systems. Most have an orientation toward either data modeling or process modeling — but not both. In short, the world of methodologies is a mess. Unfortunately, methodologies are at the heart of unlocking the productivity promised by CASE.

Indeed, the best methodologies seem to be those informal ones that experienced systems developers know intuitively. If one is serious about CASE and about methodologies, I suggest the following criteria be used to sort the goats from the sheep:

- How big is the methodology? If it is bigger than one three-ring binder, then it probably is too cumbersome to be useful.
- Does the methodology describe how to do things? If so, it will probably be very complex to use. It should describe what is needed and when.
- Is the methodology biased toward either batch or on-line processing? If so, it is likely to have major omissions.
- Does the methodology formally recognize and separate the needs for primitive information

and processing from derived data and processing? If not, the output will likely be very large and constantly changing.

- Does the methodology recognize and support the abstraction of processing and data to its highest level? If not, it is likely that the same processing and data will occur in many places.
- Does the methodology recognize the need for establishment of boundaries prior to development? If not, the system will change and grow beyond any reasonable boundaries.
- Is the methodology well documented? If not, how is it to be used in the organization?
- Is the methodology comprehensible to the common man? If a methodology requires a Ph.D., only a few people will ever be able to execute it.
- Can the methodology be executed in a finite amount of time? If not, management simply will have to hold its breath too long.
- Is it clear how each part of the methodology is relevant to the final product? If not, why is the activity being done at all?
- Is the methodology able to be automated in whole or in part? If not, CASE will do little.
- Is the methodology complete? Are there major aspects, such as what to do about existing systems, that are not addressed by

the methodology?

- Is the methodology written so that parts that are not applicable to a given design are obvious? Is it easy to omit or adapt parts that do not fit perfectly?
- Is the output of the methodology able to be simply and meaningfully broken into different levels of detail? If not, the methodology will produce voluminous, questionable results.

No obvious choice

When one ponders the list of desirable traits in a methodology, it is easy to see why not many methodologies strike one as an obvious choice. The secret of CASE is not in the software or the automation of design practices, but in the methodology.

Those who look to CASE for a solution, not a tool, are going to be disappointed. Those who fail to address the problems of design and lack the discipline to look beyond the superficiality of panaceas will be let down.

But don't cry too hard for them. Soon enough another panacea will spring up, and the lemmings will be off to the sea again.

Inmon is a senior principal with American Management Systems in Lakewood, Colo., and an author on the subject of data base design.

Share blame

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port. Other conclusions included the following:

- On-site support received the highest satisfaction rating in the survey, with 76% satisfied vs. 24% dissatisfied.
- Hot line telephone support also received high ratings, with 69% satisfied vs. 31% dissatisfied.
- Consulting support was rated as satisfactory by 61% vs. 39% unsatisfactory.
- User response on training support was split; 55% satisfied vs. 45% dissatisfied.
- Documentation drew the highest disapproval rating, with 57% dissatisfied vs. 43% satisfied.

"When asked what single change or improvement the users would like to see, documentation was far and away the No. 1 choice," the report concluded.

Users complained about lack of clarity and user friendliness in software manuals. They want to

see better indexing and more comprehensive troubleshooting guides, the Input study said.

Documentation is often written by members of the product design team, "who frequently make assumptions about the end user's level of expertise that are not valid," the study said.

Vendors could improve user satisfaction and reduce support costs by improving customer training, the study recommended.

A lack of user training and user satisfaction with documentation leads to problems in other areas, it pointed out. Satisfaction with a field engineer who recommends to "look it up in documentation," can plunge and lead to "a strain on the user-engineer relationship" when documentation is poor, the report said.

Despite support problems, only 19% of the users surveyed said they would be willing to contract for support from a third-party supplier like Control Data Corp. or General Electric Co.

while it is used by 31% of VAX users with DBMSs. Meanwhile, 29% of the non-DBMS users have report-generation software, while this software is used by 40% of those with DBMSs.

The DBMS sites have more application software packages — 22% — than the non-DBMS sites — 9%. Only 19% of non-DBMS users have some form of office automation tools compared with 31% of DBMS sites.

VAX users

FROM PAGE 21

these sites tend to have less processing power and fewer employees and terminals than the DBMS sites. As a result, they have less data to manage.

For example, fourth-generation language application development software has an 18% penetration in non-DBMS sites,

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Chris Odgers, Director of Computer Animation, states, "Digital offers instant access to an enormous base of graphics data and that gives our creative



"Digital's ability to link all our technology lets Hanna-Barbera create TV animation that was never before possible."

teams more artistic freedom. They can create special effects that in conventional animation are either too costly or entirely impossible. Plus, by digitizing the images, the colors are brighter and always consistent from frame to frame."

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NEW PRODUCTS

Systems software

A manufacturing software system designed for the IBM System/38 has been announced by **Xerox Computer Services**.

The **Xerox Business Management System/38** features nine modules for planning and controlling manufacturing, financial and distribution operations. The modules cover purchasing, accounts payable, accounts receivable, order processing, inventory management, payroll and personnel management.

Other features include a financial

spreadsheet with on-line graphics and a tool called "the integrator" for setting up and maintaining user-defined links and postings to the general ledger.

Available separately or as an integrated system, the applications cost from \$10,000.

Xerox Computer Services, 5310 Beeethoven St., Los Angeles, Calif. 90066. 213-306-4000.

Applications packages

A Wordperfect Corp. Wordperfect-compatible version of **Office/Publisher** electronic office publishing software for

use with Data General Corp.'s CEO Office Automation Software has been announced by **Intercon Associates, Inc.**

Office/Publisher is said to accept CEO or Wordperfect documents and compose, paginate and transmit them to laser printers and typesetting equipment. It integrates with Wordperfect on DG Eclipse MV minicomputers. Modules include Text Entry and Editing, Composition and Output and Delivery.

Other features include multiple type fonts, faces and sizes; automatic dictionary-driven hyphenation; multiple-column layout; and multiple-level headers and footers.

Prices range from \$950 to \$6,000.

Intercon, 1580 Emerson St., Rochester, N.Y. 14606. 716-458-0860.

Utilities

An on-line disk defragmenter for Digital Equipment Corp.'s Microvax 3000 series of computers has been announced by **Executive Software, Inc.**

The program, called **Diskeeper**, is said to manage RA82 and RA70 disks, eliminating the fragmentation of files to allow data to be read at maximum speed while also grouping free space at the front of the disk for efficient and contiguous creation of new files.

Diskeeper runs on-line as a detached process.

Diskeeper costs \$375 for the DEC Vaxstation 2000; \$750 for the Microvax; \$1,500 for DEC's VAX 700 series; \$2,000 for the VAX 3000 series; and \$2,500 for the VAX 8000 series.

Executive Software, Suite F, 3131 Foothill Blvd., La Crescenta, Calif. 91214. 818-249-4707.

Services

A fully equipped hot site for **Disaster Recovery Service** has been established in Arlington Heights, Ill., by **ABS Associates, Inc.**

The site is said to serve users of Digital Equipment Corp. VAX systems by providing equipment and support when problems shut down a company's computer system. The service is available within 24 hours after notification of a computer breakdown.

The Disaster Recovery Service is provided on a contractual basis, the vendor said. Prices for the service start at \$1,500 per month.

ABS Associates, 3550 Salt Creek Lane, Arlington Heights, Ill. 60005. 312-577-7752.

NEW AT
AUTOFAC '87

Marc Analysis Research Corp. announced a version of its **Marc** finite-element analysis program that runs on engineering workstations, minicomputers, superminis and mainframes.

The enhanced version includes improvements in thermal, contact/friction, viscoelastic and composite capabilities as well as enhanced libraries. The Mark K.3 version can be licensed starting at \$1,000 per month. Marc Analysis, Suite 200, 260 Sheraton Ave., Palo Alto, Calif. 94306. 415-326-7511.

Adra Systems, Inc. announced the **Adraconnect** family of 16 products designed to provide computer-integrated manufacturing functions.

The main product is Adra Vault, providing a drawing data base for Digital Equipment Corp. VAX/VMS, Unix and IBM VMS/VM environments. Among the other members of the Adra connect family are the Adra File Server and the Adra Ethernet option. Adra Vault starts at \$12,000. Adra, 59 Technology Drive, Lowell, Mass. 01851. 617-937-3700.

Organization for Industrial Research introduced its **Cappstation** computer-aided process planning system, designed for single-user applications on PCs. The system includes the Oracle Corp. Oracle relational data base manager and is priced at \$10,000. Organization for Industrial Research, 100 Crosby Drive, Bedford, Mass. 01730. 617-275-1800.

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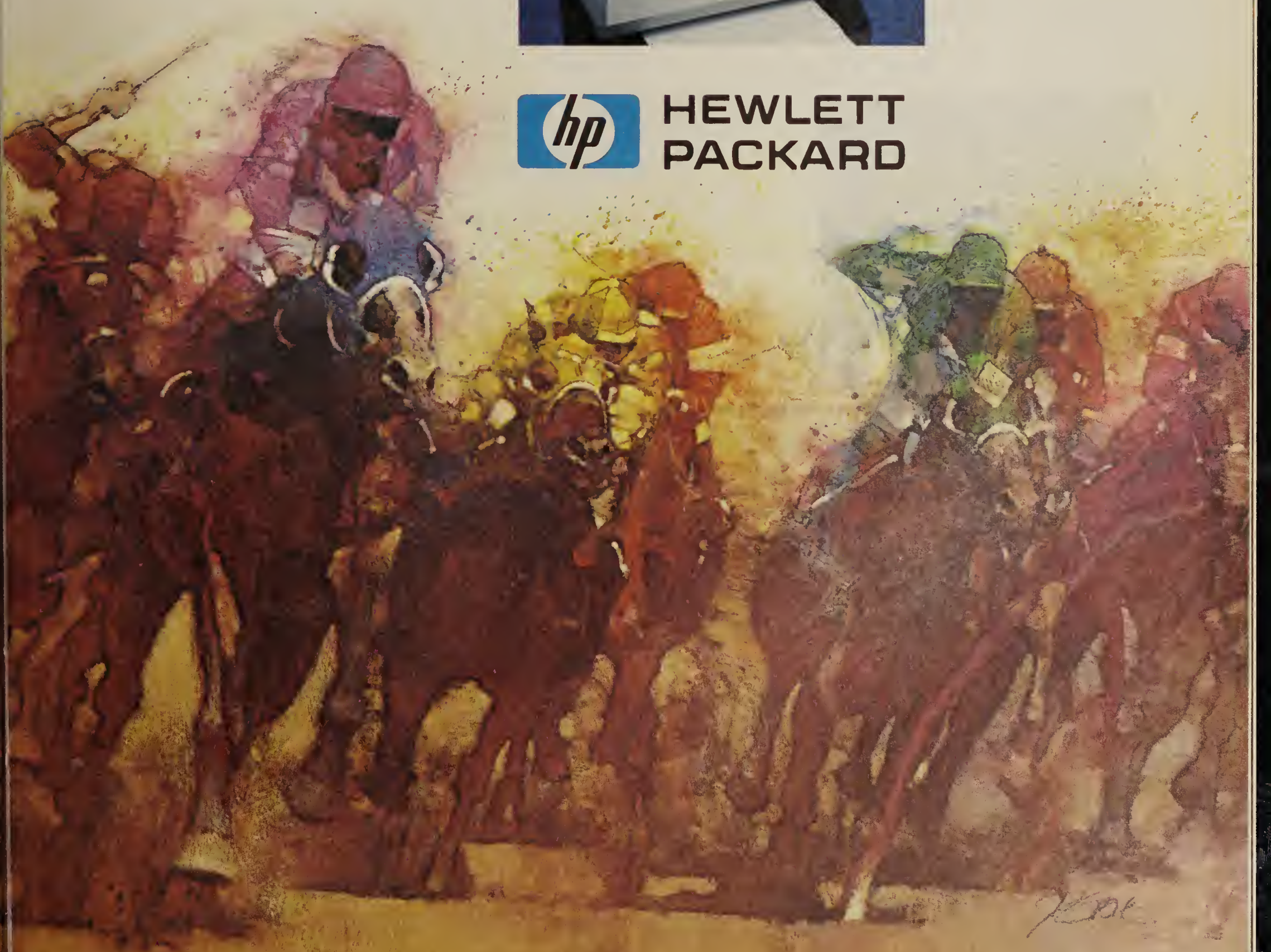
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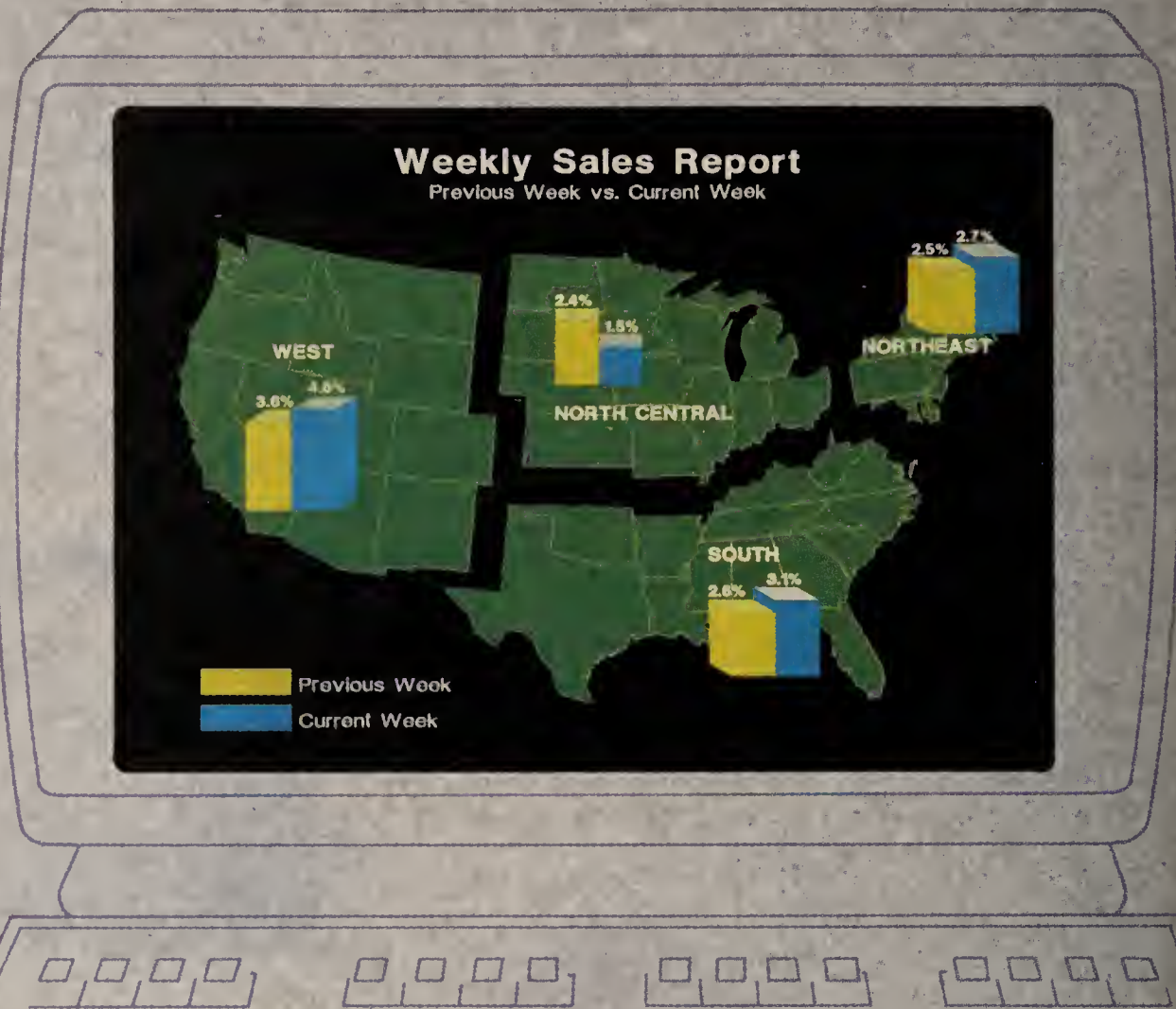
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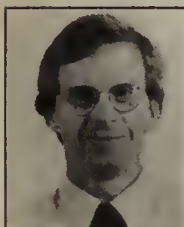
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MICROCOMPUTING

MICRO BITS

Ed Scannell

Lotus goes a cut above



Back on the razor's edge.

Agenda's recent introduction should help change the perception that Lotus has become a marketing-oriented company that has lost interest in championing new technology. Agenda really does forge new ground by giving users a fresh approach toward organizing personal information.

The only criticisms of the product we've heard are that its price is too high and its delivery to market is a bit ill-timed. Some observers say it's a product better-suited for OS/2 than DOS and should be held in the blocks for a bit.

It's too bad two of the program's authors, Mitch Kapur and S. Jerrold Kaplan, have left the company. (Ed Belove, the third author, remains as Lotus's vice-president of corporate development.) Lotus could use one or two more ideas like Agenda.

Ironically, one source told us that Agenda looks similar to a program that was being developed by Dan Bricklin and Bob Frankston, cofounders of Software Arts, in 1984-85. The program, called XPD (for Execu-

Continued on page 35

Ashton-Tate opens BBS for users

Help service, with 24-hour turnaround, mitigates pay-for-support policy

BY STEPHEN JONES
CW STAFF

TORRANCE, Calif. — Ashton-Tate Corp. last week modified its controversial pay-for-support policy by offering a multiuser electronic bulletin board service that provides free technical support to any microcomputer user.

The service, called Ashton-Tate Support BBS, promises an answer within 24 hours of a customer's query. There is no access charge or fee other than the cost of the call to the bulletin board.

The announcement is expected to be a welcome change for many Ashton-Tate users who were cut off from free services one year ago when the company implemented a pay-for-support

plan. At that time, the software developer said it could better service its customers by charging a fee, allowing Ashton-Tate to focus its resources on a specific list of users who needed consistent support.

But that did not go over well with customers, many of whom bristled at the idea of having to pay for access to a product-support telephone line.

At the low-end of the current pay-for-support plan, which was designed for individuals and small companies, Ashton-Tate charges between \$65 and \$185 per year. Corporations often pay up to several thousand dollars per year for more detailed plans.

Ashton-Tate said it does not expect the free bulletin board to replace its existing policy, but it

does hope the program will ease some users' tension.

"Now we can tell someone who doesn't buy a plan and who wants support that they can get it from the board," said Richard Goepel, manager of Ashton-Tate's support products center. "From a customer goodwill point of view, it's a good move."

Users have already responded favorably to the electronic Help board. Goepel said 400 Ashton-Tate customers have logged on to the service since it started last month. Goepel predicted that as many as 10,000 users will tap into the board at least once during the next year.

The board is open to anyone using an IBM Personal Computer or compatible or Apple Computer, Inc. Macintosh that has a

modem and communications software. Callers can peruse different boards within Ashton-Tate Support BBS that list answers to technical questions already asked, thus giving instant access to information.

Other services include classified ads and a file library of sample programs of the firm's software.

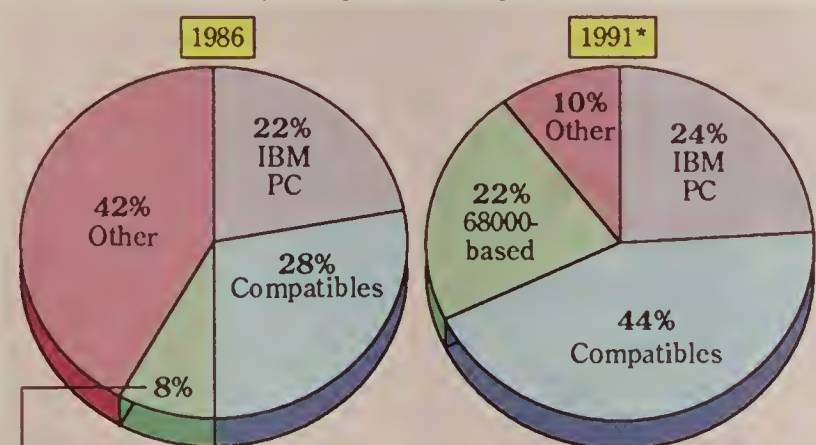
Ashton-Tate also announced Free Space, a \$69.95 software data-compression utility that allows standard DOS access to compressed files.

Inside

- Microsoft's Bill Gates wants to smash the "applications wall." Page 33.
- Beta testers like enhanced version of SQZ data compression utility. Page 33.
- Authoring package from Parallax Software creates interactive shows. Page 38.

Data View

PC market share
Percent of U.S. personal computer shipments



Motorola 68000-based PCs

*Estimated

INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

Tandon 386 portable boasts hard-disk option

BY JAMES A. MARTIN
CW STAFF

MOORPARK, Calif. — Tandon Corp. has introduced a 20-MHz Intel Corp. 80386-based system with the option of portable hard-disk storage in addition to a fixed hard disk.

The Tandon 386 features a receptacle for Tandon's Personal Data Pac, a 30M-byte hard disk drive that can be inserted or extracted on the personal com-

puter's front panel next to the floppy disk drive.

The portable hard-disk feature is in addition to the Tandon 386 112M- and 40M-byte hard-disk configurations. Benefits of the Data Pac are said to be hard-disk backup, security and portability for users who need to take large files from one location to another.

The two Tandon 386 configurations include one 1.2M-byte, *Continued on page 35*

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Report from Beta Site User



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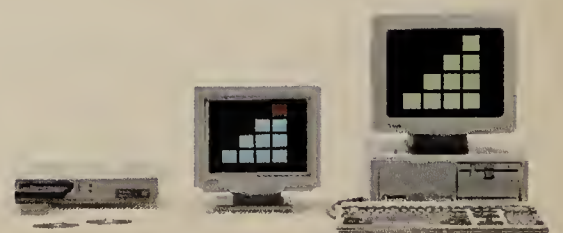
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S M A L L
T A L K

William Zachmann

IBM, with
the Works

Competition among personal computer software vendors is heating up considerably, and Microsoft

Corp.'s barrage of new products this fall is a big contributor to the heightened competition.

The latest to arrive is Microsoft Works for the IBM Personal Computer and compatibles. An earlier version for Apple's Macintosh has been one of the best-selling products for Apple Computer, Inc.'s flagship system. Works for IBM PC, PC XT, AT, Personal System/2 and compatible systems looks like a good candidate to repeat the success of Works for the Mac.

Works is a capable integrated package that includes spreadsheet, word processing, data base, communications and graph and chart capabilities. List priced at \$195, the product is primarily aimed at new PC users. It competes directly with products like Software Publishing Corp.'s PFS series and Symantec Corp.'s Q&A.

It may be a formidable competitor. Microsoft has done an excellent job putting together an integrated package that, for many users, may be the only software they'll ever need to be productive with a PC.

As basic integrated packages go, Works offers considerable power and versatility. The word processor, for example, includes a spelling checker, a

Continued on page 34

Hammering away at the applications wall

Gates envisions an architecture that would demolish barriers, says ideal exceeds MS-DOS's grasp

This is the second in a three-part series by Bill Gates, chairman of Microsoft Corp., on the evolution of computer language technology.

Conceptually, the barrier between a function inside and outside an application is an artificial one. It has to do with how programs are designed and packaged. Applications developers solve a particular set of problems and provide those solutions to users in a certain package: a program.

One can, however, visualize a software architecture in which regardless of the way solutions are initially packaged, once on the system, they become part of the overall set of system resources. Under this new architecture, any routine, regardless

of where it lies in today's "application" or "system" dichotomy, can reach out and touch any other.

(There is a parallel with the phone company. Regardless of how telecommunications services are packaged, we know that there is no major barrier between "local" and "system" services, because proper technical design and communication protocols make New York or London as accessible by phone as the local doctor's office. So it can be with all routines on a computer system.)

With the "application wall" demolished, a number of things



ROBERT BURROUGHS/GAMMA LIAISON

Bill Gates hopes to see barriers broken

become possible. Data can be transferred to and manipulated by whatever resource best handles it — whether it is for crunching numbers, sorting data, repainting a screen, moni-

toring some external device, communicating with other systems or what have you. Programmers can save an enormous amount of time by not reinventing the wheel for functions that already exist within applications; applications can be treated as traditional "system libraries" for the specialized tasks that they already do well.

Development of this architecture would require several capabilities not currently found in Microsoft's MS-DOS. Of these, the two most important are a common macro language and a common protocol for communi-

Continued on page 37

Users embrace SQZ Plus's bear hug on 1-2-3 data

BY STEPHEN JONES
CW STAFF

The imminent upgrade of Turner Hall Publishing's SQZ might cost \$20 more than its predecessor, but that apparently will not stop users from buying the update to the popular spreadsheet data compression utility.

SQZ Plus's ability to compress huge amounts of data from Lotus Development Corp.'s 1-2-3 onto a tiny piece of hard-disk real estate has inspired kudos from beta testers of the product.

"As huge as our files get around here, there's no way we could live without it," said Hutch White, head systems analyst for Blacksparks & Associates, a petroleum engineering company in Austin, Texas.

White, who has been testing a beta release for the last two months, said his company has moved over to SQZ Plus from the original version and plans to buy the package when it becomes available.

SQZ Plus will sell for \$99.95, up from the \$79.95 price tag for the current release. SQZ owners can purchase an upgrade for \$30; those who have bought the package since Nov. 1 will receive the new version free.

Shipments will start at the end of this month, said Paul Thatcher, product manager at Turner Hall.

Thatcher claimed SQZ Plus, like its predecessor, can automatically compress a spreadsheet file by up to 95%. That would mean that a spreadsheet requiring 100K bytes of memory

SQZ Plus

Price: \$99.95

- A data compression utility for Lotus 1-2-3 that also backs up and restores selected files from within 1-2-3
- Includes keystroke recorder for creating macros
- Requires an IBM or compatible personal computer, 1-2-3 Release 2.0 or higher

could be compressed down to 5K bytes for storage.

That kind of compression power has helped Turner Hall sell about 80,000 copies of SQZ since its release in April, Thatcher said.

SQZ Plus features a new set of algorithms reported to increase the compression of text

by 20% to 30%, he said. The aim is to save space on a user's hard disk and reduce communications costs when sending data across phone lines.

The updated package requires 1-2-3 Release 2.0 or higher if it is to be run as an automatic add-on within 1-2-3. With the Lotus Add-In Manager option, users can load and unload the SQZ Plus utility without exiting 1-2-3. That feature boosts the memory requirement for SQZ Plus from 30K to 40K bytes, in addition to the 16K bytes needed for the Add-In Manager.

SQZ Plus, which runs on IBM Personal Computers and compatible machines, also enables users to back up and restore files from within 1-2-3. Thatcher said the utility features an easy-to-

Continued on page 35

Aldus's Brainerd looks beyond cluttered desktop market

If anybody can be called the father of desktop publishing, it is Paul Brainerd. The wiry, soft-spoken president of Aldus Corp. has been leading the way in defining desktop publishing since 1984, when he coined the term at an Aldus board of directors meeting.

Since then, Seattle-based Aldus has been at the crest of the desktop publishing wave. Pagemaker, its best-selling interactive page layout software, has an installed base of more than 100,000 and is accepted by most as an industry standard.

But Brainerd does not plan to let Aldus rest on its software laurels. In an effort to change its image as a one-product company, Aldus recently bought two pack-

ages enhancing Pagemaker's capabilities — Freehand, a \$495 drawing tool for the Apple Computer, Inc. Macintosh, and Snapshot, a \$495 aid that captures and manipulates video images for use with IBM Personal Computers.

Now the question is whether Aldus can bolster sales by cozying up to more business users while maintaining its following of graphic arts customers. All the while, competitors like Xerox Corp. are fighting to become the de facto desktop publishing standard in the minds of MIS professionals. Brainerd took a break from his busy schedule to speak with *Computerworld* West Coast correspondent Stephen



Paul Brainerd

Jones about Aldus's strategy.

How hard will it be to overcome Aldus's reputation as a one-product company embraced primarily

by graphic arts professionals?

Our research indicates that 65% of our customers who use the Macintosh have a graphic arts background. But as we move into the personal computer marketplace with desktop publishing, about 50% of our customers have graphic arts training or responsibilities. So the nature of the market is shifting as the market develops.

As the market evolves, it starts out with initial early adopters that immediately have motivation to buy these products, and then it spreads out into a larger market.

So is Aldus following an evolving market, or is Al-

bus leading the way in defining that market?

Both. We listen to the customers through our market research, and we take that very seriously. In another sense, we can also lead the market in seeing where the technology is going and creating innovations like Snapshot.

How, exactly, do you plan to diversify Aldus?

At this point, we have a large development team, less than one-third of which are actually working on Pagemaker's specific development. We have a number of products under development for the 1988-1989 time frame that will further expand the base of Aldus-developed products. Increasingly, we're being approached by other organizations that would like us to market, sell,

Continued on page 34

Zachmann

FROM PAGE 33

good selection of character format options, multiple font printer support, diverse paragraph formats, header and footer options and data base merge capabilities.

The spreadsheet includes a powerful selection of operations, including the most commonly used scientific as well as business functions. These are all available for data base manipulation and reporting as well.

Graphics capabilities included with the spreadsheet go beyond the basic line, bar and pie charts. More sophisticated chart types like high/low/close and scatter plots are provided.

Support for IBM Video Graphics Array and Enhanced Graphics Adapter graphics, combined with line, marker, color and font selection, gives Works capabilities that, until recently, were available only with dedicated presentation graphics programs. Yet it is as easy to produce basic charts with Works as with any program I've tried.

The communications section also offers a workable capability that is more than adequate for most users. Easy file transfer, Xmodem protocol support and a straightforward implementation go a long way toward making communications accessible for unsophisticated users.

Another important advantage of Works lies as much in its ease of interaction among its parts as in each of them individually. A consistent user interface across the four main parts of the program (graphics is han-

dled within the spreadsheet portion) makes for effective reinforcement and transfer of learning.

Microsoft has done an excellent job of providing a user interface that behaves consistently no matter what you are doing. Each screen includes a pull-down menu bar at the top, status and message lines at the bottom and a formula bar on the top of the screen immediately below the menu bar.

Microsoft Works provides three levels of Help. The message line typically expands the

information on the menu. The F1 key summons context-sensitive Help regardless of where you are in the program. Also, the Shift-F1 keys will immediately put users into a context-sensitive tutorial if additional assistance is needed.

Microsoft Works is an excellent choice for a new corporate user. With its built-in tutorials, it should save PC support people a lot of time and effort getting new users started.

Zachmann is vice-president of research at International Data Corp.

Brainerd

FROM PAGE 33

support or acquire their products. So we're pursuing both strategies: product acquisition and licensing as well as our own internal development.

Is the goal to get new products that can work closely with Pagemaker?

Yes, and that's true with Freehand, which provides graphical input to Pagemaker in a very powerful way via a data format that we jointly developed with Altsys as well as with what Adobe called Embedded Postscript.

It allows you to take a Freehand-created graphic and put it into Pagemaker and print it with very high resolution. It includes such things as putting four-color separations into a Pagemaker document.

The same thing is true with Snapshot; we worked to develop a data format that allows us to take high-resolution images and bring them into Pagemaker under Microsoft's Windows on the PC.

Would Snapshot be an easier sell if it were designed for the Macintosh instead of the PC?

We plan on getting it over to the

Mac as soon as we can during 1988. The issue is having the hardware available to support video capture. We need a special board to get the video input, and we are working with a number of third parties, particularly with the Macintosh II and even the SE.

As the company tries to appeal to both graphic artists and business professionals, what will be your biggest challenge?

There are the obvious issues of maintaining our product leadership and innovation. But I think the real challenges are the people issues, of people adopting the

new technology and really understanding how to use it effectively in their organizations.

The people in the business community — be it in the graphic arts market or the mainstream business market — have to first become aware that something like desktop publishing has benefits for their organization, then learn how to apply it within their own organization and use it effectively.

How is Aldus going to stay on top as products such as Xerox's Ventura Publisher and Letraset's Ready-Set-Go gain in popularity?

We have a very dominant posi-

tion in the Macintosh market, and on the PC side of the market it's been a real horse race to date between us and Ventura Publisher for somewhat different types of publishing requirements. We were an easier to use product for interactive page layout. Their product offered more standardized formats for longer documents.

Does that mean that Aldus was forced to play catch up with Xerox and its product?

Look at our new feature set. More than half the features are ones that they don't have in their product.

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concurrently available to local DOS applications.

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As if saving time and memory wasn't enough, RabbitGATE also saves you money. It's priced competitively, yet offers built-in windowing, 8 host sessions per workstation, and access to different hosts with different

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Tandon

FROM PAGE 31

5½-in. floppy disk drive, 2M bytes of 32-bit standard random-access memory expandable to 8M bytes on the motherboard, five available expansion slots, an RS-232 serial port for synchronous and asynchronous communications and a Centronics Data Computer Corp. standard parallel port.

In addition, there are 64K bytes of static RAM cache on the motherboard for zero-wait state performance, a spokesman said. A 720K- or 1.44M-byte 3½-in. microfloppy drive and an Intel 80387 math coprocessor are optional.

Priced at \$9,999 not including a monitor, the 112M-byte version will be available in January. The 40M-byte version has not been priced yet, and because of current shortages in 80386 chips, it will be available early next year, the spokesman said.

The 30M-byte removable hard-disk option is \$349, and 20M- and 40M-byte Data Pacs reportedly will be available in December, with 70M-byte versions expected next year. Pricing has not yet been determined, according to a company spokesman.

Scannell

FROM PAGE 31

tive Personal Database), may have been sold to Lotus as part of the Software Arts deal made in April 1985.

Bricklin admits that he and Frankston were working on XPD at the time, but he says he doubts it was the "early genesis of Agenda." XPD "had notes that were sorted into different categories, but we never finished it. We ended up spending more time on Wildfire, which became [Lotus's] Express," Bricklin said recently. "Besides, Kaplan had his own ideas about certain things."

Anyway, Bricklin says he thinks the Belove-Kaplan-Kapor team did a pretty good job in crafting the software. He adds that it's a perfect program for portables. "It's something you could burn into a Clive Sinclair machine," Bricklin says, "something light you could carry with you."

No jive from Clive. Speaking of Clive Sinclair, the inventor of the \$99 Sinclair portable (Does CP/M still mean anything to anybody out there?) introduced another interesting little product at this month's Comdex show in

Las Vegas.

His latest creation is the Z88, a Zilog Z80-based system that addresses up to 4M bytes of memory.

Priced at \$400, the system measures 11½ by 8¼ by ⅞ in. and has an eight-line supertwist LCD. Built-in software includes Pipedream, which mixes word processing, a spreadsheet and a data base; Diary, a free-form log; and Z80 BBC Basic.

The system also comes outfitted with PC Link, which allows it to send and receive files from an IBM Personal Computer or compatible machine. Four standard AA batteries give users approximately 20 hours of computing time.

Go On wid ya bad self, Mitch. It looks like Mitch Kapor just can't sit still. Last week he announced a second start-up called On Technology, which will develop programs that, like Agenda, reflect the way people work and think.

But don't expect to see products from On Technology in the near future. Like Go Corp., which Kapor formed earlier this year with S. Jerrold Kaplan and Robert Carr, On Technology won't be delivering products for a couple of years.

And with Agenda not ex-

pected to be delivered until early spring, Kapor's first deliverable product may be a bagel with lox at the delicatessen he plans to open in Harvard Square in February.

R.I.P. Another pioneer portable was laid to rest last week when Kaypro announced it is discontinuing its K1, K2X, K16 and K162E models.

Two months ago, Compaq

announced that its Compaq Portable had also expired.

Like the Compaq Portable, the Kaypro series was introduced in 1982. The systems brought in about \$250 million for the company during the last five years. The company is replacing the line with its Kaypro 286 machine.

Scannell is a *Computerworld* senior editor, microcomputing.

SQZ Plus

FROM PAGE 33

use interface that creates a log of backup files or tells users how many disks are needed to back up another file.

Beta testers also gave high marks to the program's history tracking capabilities, which let users record information in a Lotus file showing who has edited a file and how often it has been used.

"It's a handy feature because, as a manager, I can check on the work of others over several months and see exactly what has been done to a spreadsheet," said Bart Delaney, director of finance for a group of six Catholic schools in New York.

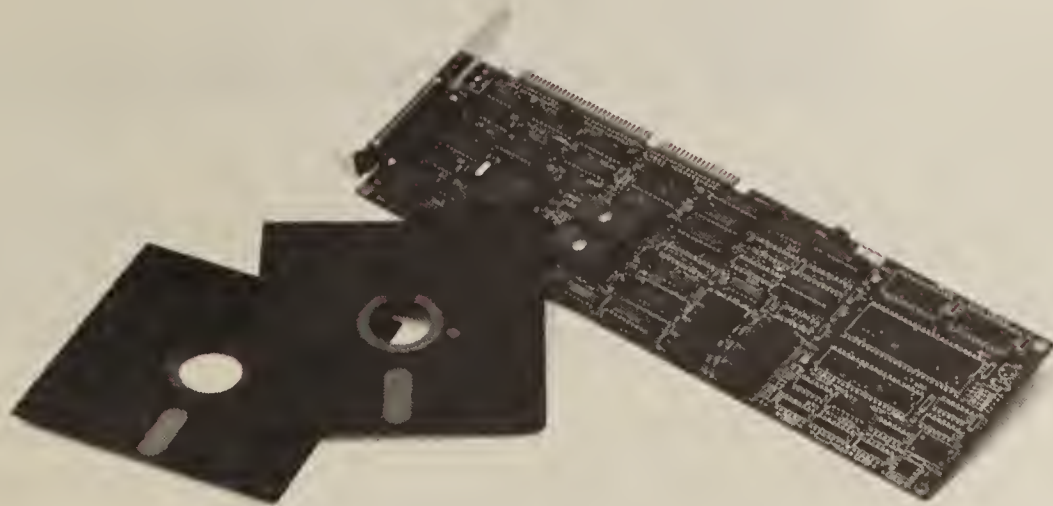
Delaney said SQZ Plus makes

it easy to create macros because the program can save into a script file every keystroke entered by a user. The user can then select certain keystrokes to build a macro. "It's nice because you don't have to go to the trouble of writing down every keystroke if you want to create macros," Delaney said.

Despite the improvements, White said SQZ Plus offers no discernible increase in the time it takes to store or recover a compressed file. He said it can take up to three minutes to call up a large worksheet, or roughly three times the delay when calling up a regular Lotus file.

Thatcher said users can expect a new SQZ product for the 3.0 release of 1-2-3 after that product ships in the second quarter of 1988.

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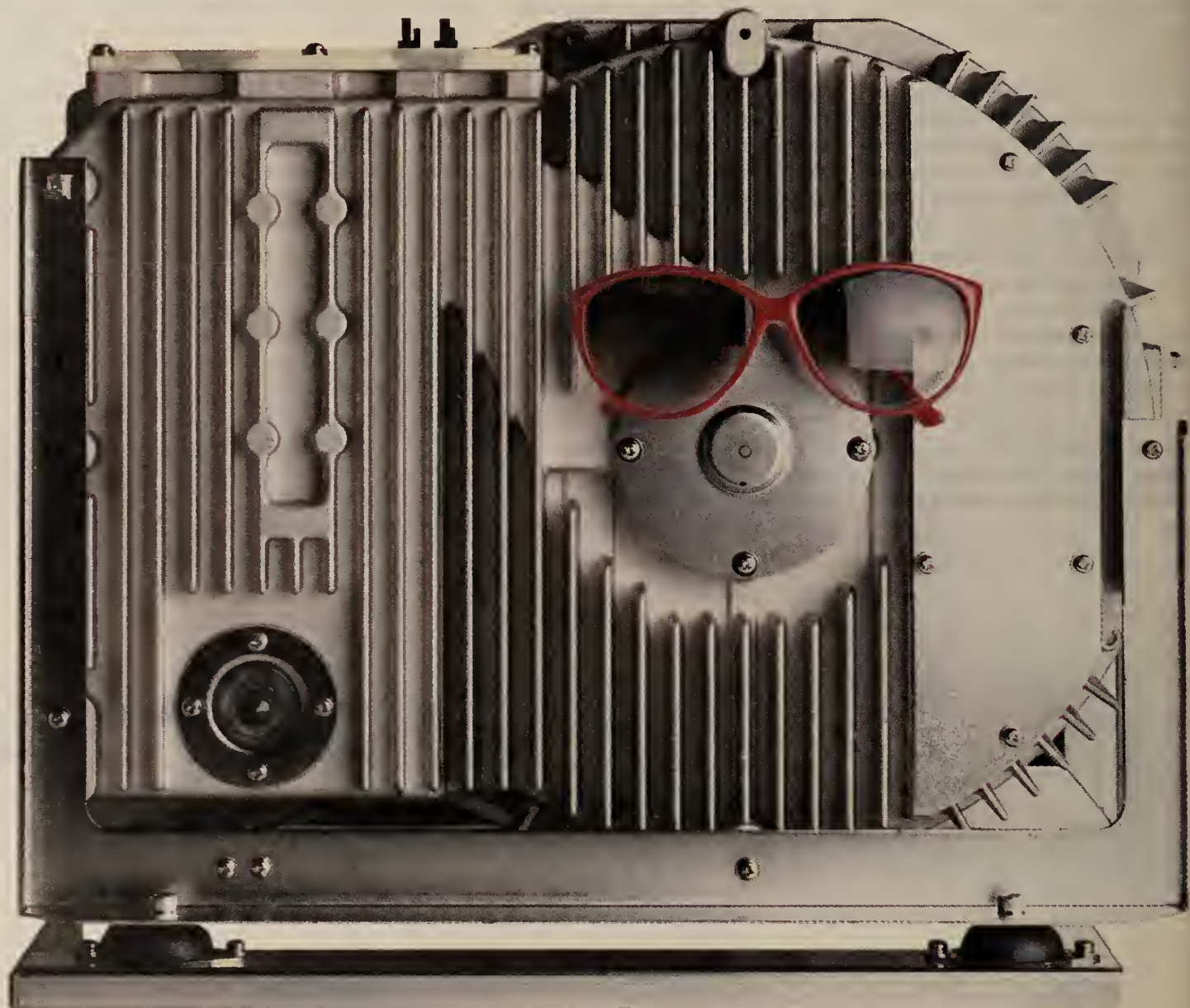
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Additional Features

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80 or 132 column display
30 programmable function keys
Easy setup menus
RS232C and 20m current loop interfaces
9-pin RS232C printer port

Other

1 year warranty
Jump or smooth scroll
Compose character capability
Nonvolatile memory for saving setup
National language layouts available

DEC VT220, VT100 and VT52 products of Digital Equipment Corporation
DEC is a registered trademark of Digital Equipment Corp

HP 700/71
IBM 3191 Compatible Terminal

Compatibility Modes

IBM 3191 Models A and B, Display Station
IBM 3270 Information Display System, coax connection

Keyboards

IBM style 102 and 122 key layouts
24 programmable function keys for application use
Tactile feedback

Ergonomics

14-inch anti-glare screen
Green or amber display
Tilt and swivel
Front panel controls
Detached adjustable keyboard

Additional Features

Security lock and keys
Automatic screen saver
Easy setup menu

Other

1 year warranty
Nonvolatile memory for saving setup information
National language layouts available

IBM 3191 Display Station and IBM 3270 Information Display products of International Business Machines Corp.
IBM is a registered trademark of International Business Machines Corp

HP 700/41
Entry Level ASCII Terminal

Compatibility Modes

Wyse WY-30
TeleVideo 905, 910+, 925E
Lear Siegler ADM 3A, ADM 5
Hazeltine 1500
ADDS Viewpoint A2
Qume QVT-101

Keyboard

Enhanced 106 key layout
16 function keys (32 shiftable)
58 programmable keys
Tactile feedback

Ergonomics

14-inch anti-glare screen
Green or amber display
Tilt and swivel
Front panel controls
Detached adjustable keyboard

Additional Features

2 standard RS232C ports
Split screen capability
Easy setup menus

Other

1 year warranty
Variable smooth scrolling
Copy and transparent print modes
Nonvolatile memory saves setup, programmed key info
National language layouts available

WY-30 product of Wyse Technologies Systems.
TeleVideo 905, 910+ and 925E products of TeleVideo Systems, Inc.
ADM 3A and ADM5 products of Lear Siegler Corp.
Hazeltine 1500 product of Esprit Systems, Inc.
ADDS Viewpoint A2 product of Applied Digital Data Systems, Inc.
QUME QVT-101 product of Qume Corp

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Gates

CONTINUED FROM PAGE 33

ation between applications to ensure an accurate exchange of commands and data.

Just as users benefit from the comfort, ease and reduced training time of a common graphical interface to a computer, they can become far more productive if they have to learn only one macro language that works across a range of often-used applications. Users can spend their time concentrating on their work rather than on the subtle or not-so-subtle differences between macro command sequences for their word processors, spreadsheets and data base programs.

In addition, the common macro language could become a simple command language for the operating system itself, supplementing or replacing the MS-DOS batch language or the short Basic programs commonly used for the routine "housekeeping" programs on most systems. Being identical to the macro language inside applications, it would save users from having to learn still another language, however primitive, and it would be able to unlock routines within applications — something no current command language can do. Users would invoke the macro language from within an application or from the system level according to their needs.

Benefits

It must be emphasized that a common macro language will neither replace individual applications nor in any way unravel them; it will simply tie them together more easily. Each application will remain unique and serve its traditional function, and users will still look to the market for applications that best serve them.

The advantage of a common macro language is that it will allow all users — both traditional end users and traditional programmers — to more easily use individual applications as building blocks for office automation and for integrating major system software applications.

Another major development will be the evolution of traditional languages toward an "ideal" language. The word "ideal" does not mean that there will only be a single language for all programming problems. Each language, by its design, tends to be best for solving certain kinds of problems, and developers are usually strongly bound to their favorite.

A working definition of an ideal language is one that makes programming extremely easy for the beginning or general user and includes certain capabilities and approaches to programming that can easily be included in all other mainstream languages.

One underlying assumption is that this language will build on an existing language standard. Basic is an obvious choice because it is widely used and has already evolved, for example, with the addition of control structures similar to those found in other high-level languages.

An ideal language will also provide the interactiveness and ease of an interpreter as well as the execution speed of compiler. As a result, the waiting time associated with compiling will disappear. The current generation of computer languages on the personal computer, offered by several vendors, has improved compilation speed but has not provided both compilation speed and interactiveness; the very latest language technology is now changing this

dramatically, at no cost to the execution speed of the finished program. In addition, more improvements are likely.

This ideal language could also evolve to become something of a fourth-generation language, providing full-screen capabilities, report generation and full support of data base creation and access.

Modular programming is the only sensible way to write any but the most trivial program. Designing a program in small parts that work together well, can be easily tested and can be easily reconfigured is a worthy goal, but keeping up with the pieces — whether they be dozens of modules for an experienced programmer or a handful for a novice — can be a daunting chore. Failing to include a single module, or to include the correct version of one,

can wreck a program. It can take days or weeks to find and fix such subtle problems.

Numerous MAKE facilities have been developed to keep track of modules and ensure that developers have properly updated all parts of a program once changes have been made. But that is only half the problem.

It is not unusual during program creation and revision for a developer to add and delete modules and to move code from one module to another in all sorts of ways. This work, which is tedious, time-consuming and subject to errors, still must be done manually. An ideal language will make it trivial to move code from module to module and will automatically build MAKE files for users and modify

them automatically as the user reorganizes them.

Some of these facilities, such as automatic MAKE, have become available this year; automating module creation is an exciting new concept to allow all programmers, at whatever level, to practice the preferred method of programming without the attendant headaches.

Obviously, such capabilities can be designed into any language; if an ideal language does not come to pass, it is still highly probable that a family of languages will emerge sharing many of these characteristics.

Gates will conclude this series next week with a discussion of an integrated development environment, development tools and the emergence of standards.

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— Phil Thomas
Thomas Business Systems



Phil Thomas is President of Thomas Business Systems of Boca Raton, Florida. Thomas Business Systems buys, sells and leases new and used IBM, DEC and Data General equipment. They've been doing so for 10 years.

In that time, Phil has used many methods of getting his message across to buyers and sellers. He's advertised in several publications off and on. But for 10 years, he has advertised regularly (an average of once every two weeks) in *Computerworld's* BUY-SELL-SWAP section.

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NEW PRODUCTS

Systems

Matrix VIP, a product said to combine graphics, animation, sound and video in one portable presentation system, has been announced by **Matrix Instruments, Inc.**

According to the vendor, Matrix VIP presentations can be shown on computer monitors, televisions and video-projection systems. The standard configuration includes a 1.2M-byte IBM Personal Computer AT-compatible disk drive, 1M byte of random-access memory, remote

control, a built-in speaker and a sound effects library.

VIP Director software allows users to take computer images generated in Matrix's MVP data file format and add transitions, animated sequences and prerecorded video.

Pricing starts at \$3,995.

Matrix, One Ramland Road, Orangeburg, N.Y. 10962. 914-365-0190.

Software applications packages

Book One, an interactive desktop authoring software package for the IBM Personal Computer and compatibles, has been announced by **Parallax Software Publishers, Inc.**

Book One is said to allow us-

ers to create interactive presentations combining color pictures, sound, text and animation. Users select commands from icon menus. Seven kinds of graphics elements are included as well as a library of more than 200 pre-designed drawings, sounds and animations.

Other features include program generation, a runtime module, a type-font editor and the ability to mix elements on-screen.

Book One is priced at \$295.

Parallax Software Publishers, 2550 Ninth St., Berkeley, Calif. 94710. 415-848-9898.

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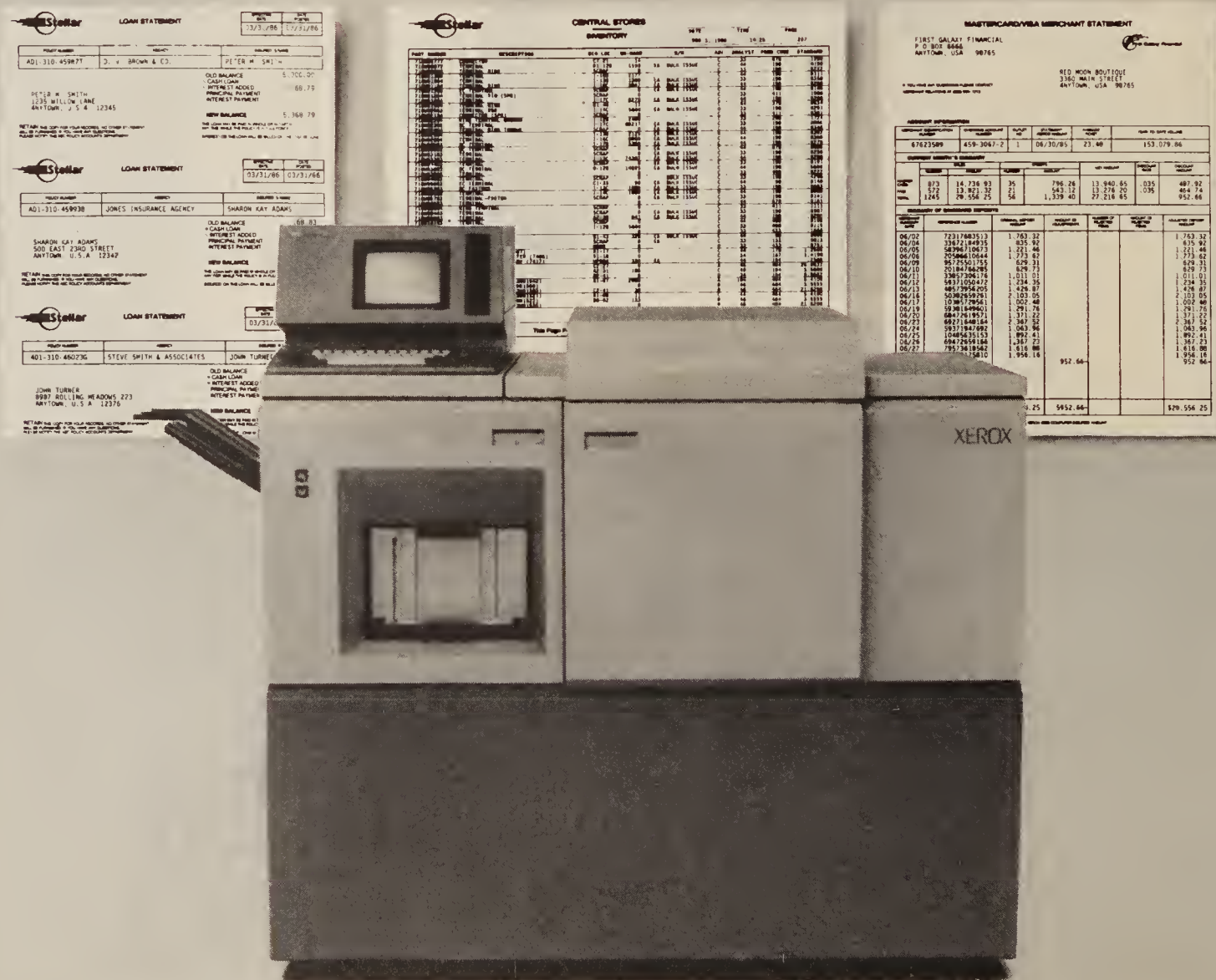
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Software utilities

Houston Instrument, a division of Ametek, Inc., has introduced a software program said to enable users to edit and manipulate drawings scanned into a computer using its wide-format Scan-Cad plotter accessory.

The software, called **Hi-Scan Raster Graphics Toolkit**, is an icon-driven utility package. Users reportedly can input and edit up to an E-size raster-image file created with Scan-Cad. Users can also manually convert the raster file into a vector file.

Hi-Scan is available free of charge to registered users of Scan-Cad Model 128. Scan-Cad, an option for the vendor's DMP-50 series plotters, costs \$2,995.

Houston Instrument, 8500 Cameron Road, Austin, Texas 78753. 512-835-0900.

Development tools

BPOS/Coder, a personal computer-based software package said to allow users to generate both mainframe IBM CICS programs and Basic Mapping Support (BMS) maps, has been announced by **MacKinney Systems**.

According to the vendor, the generated CICS program contains all the code needed to send and receive the screen. BPOS/Coder can generate PC/Cobol programs, according to the vendor.

BPOS/Coder runs on IBM Personal Computers. It costs \$900 per PC or \$12,000 for a site license.

MacKinney Systems, Suite 112, 2674-A S. Glenstone, Springfield, Mo. 65804. 417-882-8012.

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DATA STREAM

Patricia Keefe

IBM: APPC's the way to go



Noooo doubt about it. Developers of distributed processing packages should write to IBM's Ad-

vanced Program-to-Program Communications (APPC) interface. That's the definitive word from Michael O'Dell, product manager for IBM's local-area network System Products, who spoke at IBM's one-day telecommunications seminar in Boston two weeks ago. He also said Microsoft's LAN Manager "was not consistent" with IBM's Common User Access interface, according to analyst Tom White, president of Santa Clara, Calif.-based Infonetics.

Gutless wonders. The announcement of diskless personal computer support under IBM's PC LAN Program 1.3 network software has probably set some minds to wondering just where those IBM models are. Start with easily convertible 3270 terminals featuring internal floppies and microcode, and then proceed to IBM's Raleigh,

Continued on page 42

SAA may get OSI protocols

IBM exec confirms move, but transparent SNA-OSI links stay shrouded

BY ELISABETH HORWITT
CW STAFF

CAMBRIDGE, Mass. — IBM has said it intends to make certain Open Systems Interconnect (OSI) protocols part of its Systems Application Architecture (SAA), but the firm still has not defined which OSI protocols will be included.

Analysts recently briefed by IBM came away with unanswered questions as to when, or whether, their clients will gain transparent, efficient connections between OSI and IBM's Systems Network Architecture (SNA), they said.

At a recent seminar hosted by IBM here, Ellen Hancock, president of IBM's Communications Products Division, said the vendor is developing OSI products and interfaces to OSI, reported Fred Chanowski, president of Needham Heights, Mass., consulting firm Telecommunications Management Corp.

IBM representatives "told me that they were not sure whether they would be providing a true OSI protocol stack [on their systems], as DEC does," said David Terrie, president of Newport Consulting in Scituate, Mass. IBM did say that OSI protocols will be included in SAA "to

the extent to which they conform to SNA," Terrie noted.

He suggested that IBM will provide two types of SNA-to-OSI integration. OSI protocols that comply with the SNA architecture will be able to communicate transparently with SNA systems. In contrast, connections between SNA and those OSI protocols that diverge from IBM's communications architecture will require a gateway — a separate processor that converts one stack of protocols to the other and "may be less than optimal in terms of performance and functionality," Terrie said.

Continued on page 42

Proteon revamps, looks to step off treadmill

BY PATRICIA KEEFE
CW STAFF

WESTBORO, Mass. — Fiscal 1986 was a year that token-ring vendor Proteon, Inc. would probably just as soon forget. Sluggish sales, severe marketing and distribution problems and the departure of its second president in as many years kept Proteon on a treadmill — running hard but getting nowhere fast.

The timing was unfortunate

given that many frustrated would-be IBM Token-Ring network users were looking for alternatives to IBM's mysteriously unavailable adapters.

When residue from this goulash of problems threatened to spill over into the first half of fiscal 1987, Texas-based investor L. J. Sevin rode in to save the day.

The cofounder of Sevin Rosen Management Co. completely revamped Proteon's executive

structure and then set about filling key vacant positions. Within the past six months, Proteon has added Daniel Smith, formerly with IBM's Rolm Corp., as vice-president of sales and Daniel Capone Jr., formerly with Charles River Data Systems, Inc., as vice-president of manufacturing operations. Sevin was slated to introduce a new president late last week and expects to phase out of the day-to-day operations by December.

Sevin also managed to sort out Proteon's distribution problems, along with 22 unproductive distributors, said company founder Howard Salwen (see story below).

Continued on page 42

Inside

- Thomas-Conrad offers Arcnet interface board for IBM's PS/2 Micro Channel. Page 46.
- General Datacomm Industries introduces integral dual-channel time-division multiplexer. Page 46.

Proteon's Salwen says firm steady after the storm

Credited as the driving force that carved token-ring vendor Proteon, Inc. a niche far out of IBM's reach, founder Howard Salwen is also thought by some observers to be difficult to work with and unable to delegate. With some help from chief investor L. J. Sevin, Salwen is working hard to dispel that perception. Taking advantage of the slow pace at Localnet '87, Salwen recently updated Kathy Chin Leong, *Computerworld's* West Coast bureau chief, on his company's efforts to rebound from past difficulties (see related story above) and outlined Proteon's future directions.

It has been very quiet over at Proteon.

Proteon has weathered a storm. This past spring we had a lot of personnel turnover. We got ahead of ourselves. We opened up with a lot of distributors in

1986, and many were not capable of supporting and selling our product. We had to retrench and shut down some distributors.

What has sustained Proteon?

The strength of our [token-ring] product has pulled us through this. We got a lot of help from L. J. Sevin. We weathered the storm. Our company still has a very strong balance sheet. We are still private, so we don't publish what we do, but we did almost \$20 million last year.

Weren't there layoffs?

That layoff was never a quote from Proteon, and I won't comment on it, except that some people were fired, and some positions were eliminated due to merging of different job responsibilities.

The most important thing L. J. has done for us is restructure



Howard Salwen

top management, and that is exciting. Our new chief executive officer will start very soon. The changes in the staff are all for the good.

What does the financial picture look like for year's end?

This is going to be a good year considering we had such a bad

first half. We will still grow a considerable amount, about \$20 million to \$30 million in sales, and I think that is excellent.

How has token-ring technology been accepted?

I am pleased. I think the business is coming toward Proteon. In 1981, most of the LAN effort was geared toward terminals to hosts. Now everybody wants token-ring. It's not just because of capacity, but the maintainability and availability of the network.

What big issues or technology made a difference to the network industry this year?

What is starting to emerge is the issue of management and interconnection. We are concerned with management techniques of both LAN-to-LAN and LAN-to-wide-area networks.

This year, half of our business

has been in the interconnection, which was not an issue two years ago.

Will IBM's OS/2 impact Proteon?

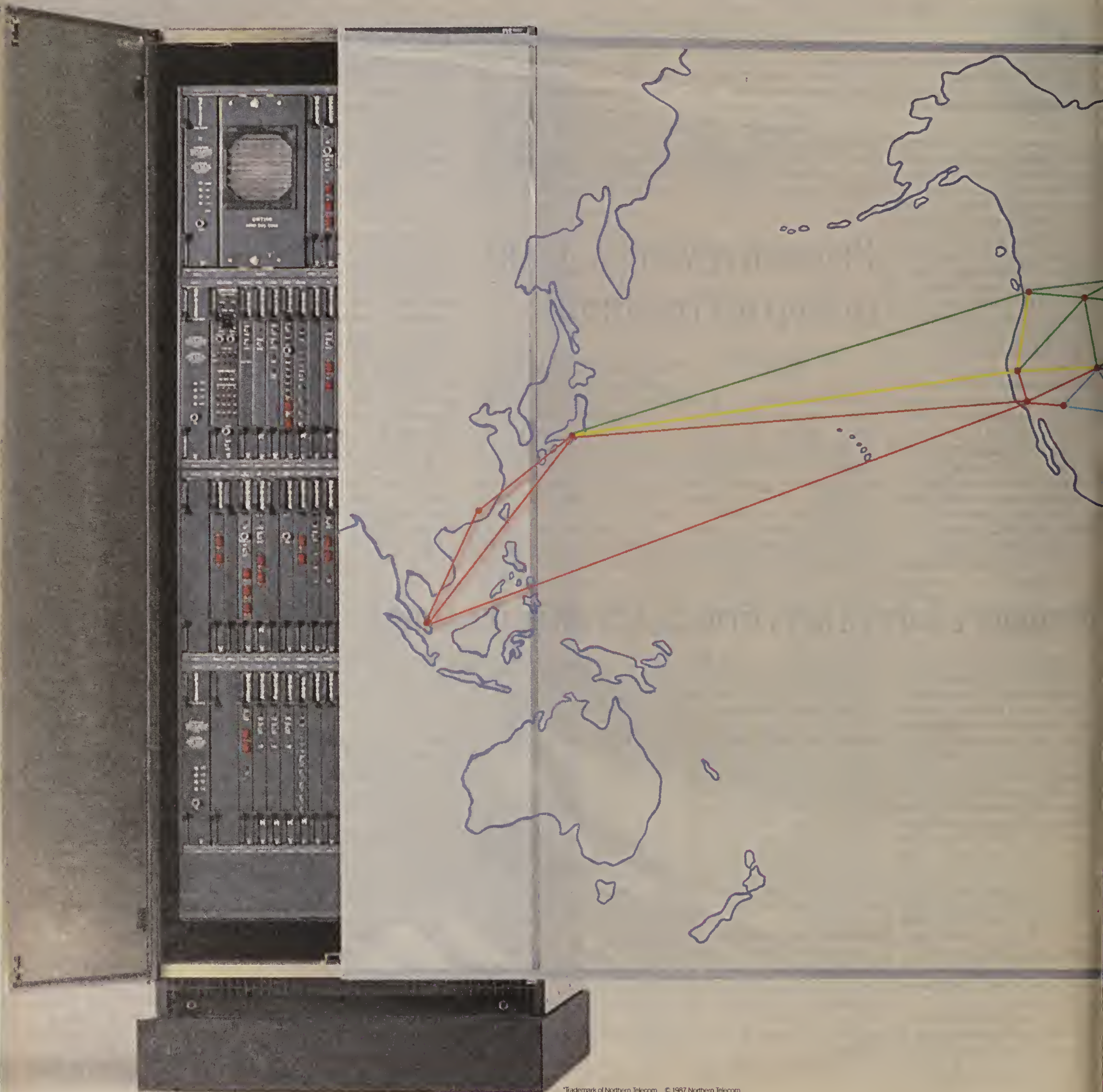
No. We are not in the software business. All we would have to do to our boards is develop a handler. For instance, we have a new Micro Channel-compatible card, and we had to do a driver under [Microsoft Corp.'s] MS-DOS to the Novell shell. It took only 45 minutes. The same thing is going to happen with OS/2. We will probably have to change our drivers and work on the LAN Manager when it comes into being. If our customers want it, we will do it.

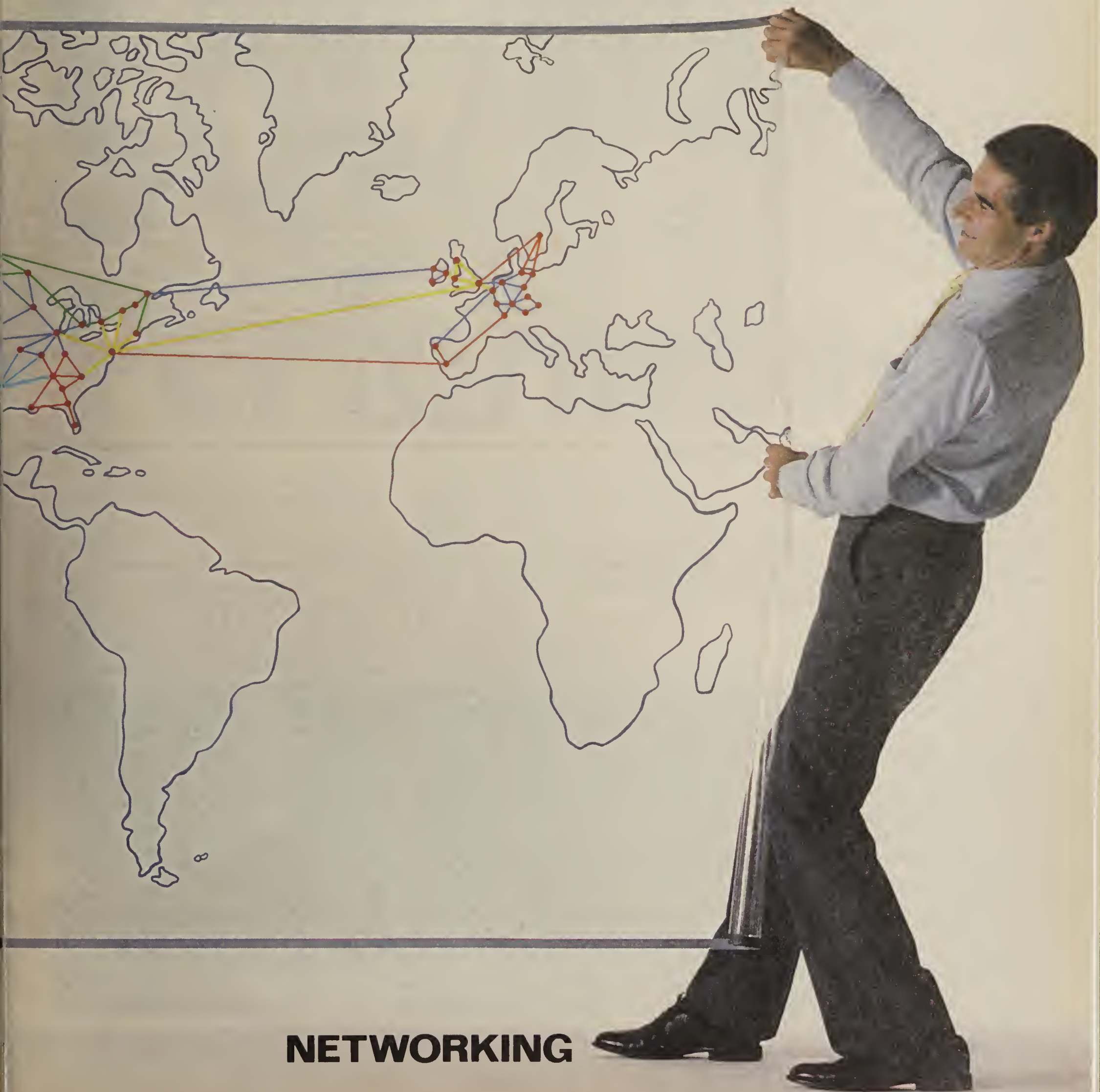
What about Netview?

The smoke hasn't cleared on that. We have to review which network management package we want to support. We haven't heard from our customers on that one. Many don't understand what these packages are yet.

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NETWORKING

3+Open

FROM PAGE 39

For example, Bressler said, users will be able to mix 3+Open with workstations running OS/2 Extended Edition and using IBM's Communications Manager.

3Com also assured customers of its current 3+ products that it will provide upward compatibility with 3+Open. It will do this by porting its implementation of the Xerox Corp. Network Systems protocol to run in protected mode under OS/2.

Further, 3Com said it will provide Named Pipes extensions to the LAN Server if IBM chooses not to. Named Pipes is an applications programming interface (API) under the LAN Manager.

In a white paper released in response to IBM's LAN Server announcement, 3Com claimed that IBM has said it will use Named Pipes technology within the LAN Server but has not indicated whether those APIs will be provided to developers.

An IBM spokesman recently suggested that developers of distributed applications write to IBM's Advanced Program-to-Program Communications (APPC) interface.

Support, not replace

APPC will be supported by 3Com, Bressler said, but is not a replacement for Named Pipes, which he said is better suited for work group communications. "Either IBM will announce that they'll make these Named Pipes available or 3Com and Microsoft will provide a little extension that provides this capability," he said.

3Com will also extend its family of Advanced Network Service products to run in the OS/2 environment, suggesting it can differentiate itself from IBM in these areas.

Less clear were 3Com's plans in the network management area. "We expect to compete effectively with IBM in this area," Bressler said, adding, "It is inevitable that we will allow monitoring of our products from Netview."

According to 3Com's white paper, key features of 3+Open will include the following:

- Use of OS/2 as the core network server operating system.
- Support of Microsoft's MS-DOS and MS OS/2 and Apple Computer, Inc.'s Macintosh network workstations.
- Compatibility with IBM's PC LAN Program, allowing 3+Open workstations to share data with IBM PC LAN servers and vice versa.
- Support for Open Systems Interconnect and Transmission Control Protocol/Internet Protocol.
- Support of IBM Token-Ring and Ethernet standards.

Keefe

FROM PAGE 39

N.C., plant. IBM officials told Forrester Research that its Raleigh division has a diskless PC under wraps. IBM also has a diskless PC, a version of the PS/2 Model 30, for competitive bidding, said Clare Fleig, an analyst with International Technology Group in Los Altos, Calif.

Once is enough. Privately held Sytek has had a tough time in recent years. The negative aura surrounding the company in 1986 was such that Sytek felt compelled to release a financial report to the press and analysts — a highly unusual move, to say the least. But that was last year, before Sytek parent General Instruments put its 57% stake in the network vendor up for sale. So far, there's been lots of whispering, but no takers.

Not long ago, *Computerworld* heard that until Sytek's financial position improves, and no doubt the stock market as well, General Instruments is in much less of a hurry to unload its Sytek stock. Despite the uncertainties of the pending stock sale, Carl Goldman, Sytek's vice-president of finance, is expecting a "very successful" year. Look for Sytek to release some "very positive" financial numbers at the end of its fiscal year, he said.

As for General Instruments, "the situation appears as if it will be resolved in a favorable way to Sytek," Goldman said, stressing nothing is imminent.

Twisting in the wind? If the recent Localnet '87 is any indication of the caliber of future shows, it might be pack-it-in time for the only trade show dedicated to micro communications. Beset by scheduling and location problems, the show suffered a severe lack of exhibitors and attendees. "It was a dog," exclaimed one public relations woman.

Attendance estimates from show sponsor Conference Management Corp. ranged from 1,000, including 67 vendors, to 2,500, including 75 vendors. Some showgoers estimated only 500 attendees. The 135 booths were easily covered in an hour, and seminars were poorly attended. Conference Management said the show lost money and may do so again next year.

Don't look now. A spokesman for Hayes recently assured us that founder Dennis Hayes' pending divorce will not affect the company. He added that the modem maker has already taken steps to shield financial information revealed during the divorce proceedings from the prying eyes of competitors.

Keefe is a *Computerworld* senior editor, networking.

SAA

FROM PAGE 39

"IBM has the most to lose if OSI takes off; they'll accommodate user demand for OSI protocols, but they don't want SNA to be just another system on an OSI backbone. They want SNA to be the backbone," Terrie said.

IBM also sees SNA as the hub of — and definitely not a spoke in — the corporate networking system, Donald Gladstone, program manager for IBM's OSI Project Office, noted.

IBM intends to develop interfaces that allow "someone to manage OSI devices from Netview," Gladstone said, and also plans to come out with OSI-compatible products that "can respond to other OSI network management products." However, "the SNA component of

the network certainly would not be managed by an OSI device," he said.

IBM "clearly intends to make OSI part of SAA" but is still deciding which interfaces and elements of OSI to put in its architecture, Gladstone added. Once the OSI-SAA integration is in place, applications can be written to access OSI functions on IBM Personal Computers, 370s and System/36s and 38s, he noted.

However, the applications will not be portable to an SNA environment on those same systems unless the OSI protocols involved are SNA-compliant, Gladstone cautioned. "For example, if the OSI teleprocessing interface winds up being close to LU6.2, then maybe users will be able to port applications between LU6.2 and OSI interfaces."

Proteon

FROM PAGE 39

According to Sevin, the company has been making money for several months and is meeting financial and sales plans. "I'd like to express my delight that we're back among the living," he said.

In addition, the company is readying some new products. IBM Micro Channel-compatible adapter cards reportedly will ship by the end of the month, as will the Pro-Net 10 Manager di-

agnostics software.

"We've been reviewing our strategic direction and will make an announcement in early '88 about where we are going," said Sevin, adding that Proteon would like to be supported by, and support products from, both Banyan Systems, Inc. and Novell, Inc. Still on the agenda are plans to go public. "The market destroyed us, so we'll have to wait around quite a while," Sevin said. "I'd like about a year's worth of performance out of the company first."

Data View

Packet switch features' breakdown

What major vendors are offering in X.25 systems

Vendors		Packet switch	Integral packet assembler/disassembler (PAD)	Stand-alone PAD	Network management center(s)	Diagnostics	Auto fault detection and recovery	Network logging console(s)	Auto billing, alarms and status capture	Routing	Dynamic by call	Dynamic by packet	Load balancing	Operator specified	Fixed alternate route	Dynamically balanced	Network security system	Name/password	Destination password	Data encryption	Data compression	Traffic prioritization	Port basis	Call basis	Host protocols	Asynchronous	Synchronous	Binary Synchronous (X.25)	Synchronous Data Link Control	Port/Trunk rates	19.2K to 64K bit/sec.	75K to 256K bit/sec.
Amdahl Corp.	4510																			2												
Amnet, Inc.	7400																															
BBN Communications Corp.	C3																			4												
BBN	C300																			4												
Codex Corp.	6510																															
Cygnus Computer Corp.	NP100																			7												
Cygnus	NP200																			7												
Siemens Data Switching Systems, Inc.	2520																															
Dynatech Packet Technology, Inc.	12A																			4												
M/A-Com, Inc.	9724																			16												
Memotec Data, Inc.	SP8500																															
Northern Telecom, Inc.	DPN 50																			4												
Paradyne Corp.	5202																															
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Telematics International, Inc.	200																															
Telematics	2000																															

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Weighing in at just 180 lbs, the A1 is the smallest, most economical mainframe made. Though it's the size and price of a minicomputer, it runs the same operating system as the A15, one of the largest mainframes made by anybody. It also grows within the same cabinet to the new A4 and A6 models.

What potential!

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You can also use a Smallframe as a departmental computer that shares data with your main mainframe. Either way, it's a perfect complement to your mainframe computing power.

Vital statistics.

The newborn A1 in minimum configuration comes with more capacity than its comparably priced playmates can even think about. A 12 megabyte memory that expands to 48. A 125 Mb to 500 Mb in-built disk (external attachments that take you past 7.5 *gigabytes*). Plus virtually unlimited virtual addressing.

All three are friendly little guys, too. Small Computer Standard Interface (SCSI) is built in, so like their larger



Unisys A Series siblings, the Smallframes talk to all kinds of industry standard peripherals.

There's more to their friendliness than interfaces, too. The machine runs happily in any ordinary office environment, plugged into a standard wall outlet. Newer technology means Smallframes use less power, make less heat and give you improved reliability.

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For about the price of a minicomputer, the A1 can give you proven mainframe-style applications. And if your growth takes you beyond Smallframe capacity, you can be sure that all your hard-won data and fine-tuned operations will still work. No matter how big an A Series computer you end up with.

All in all, the best thing about the A1 is that it sees the world the same way the entire A Series does. Same operating system. Same interfaces.

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NEW PRODUCTS

Local-area network hardware

The TC6046 Arc-Card/MC, an Arcnet interface board for the IBM Personal System/2 Micro Channel, has been announced by Thomas-Conrad Corp.

The TC6046 Arc-Card/MC allows the user to network Micro Channel-based computers to the Arcnet token-passing local-area network. It utilizes IBM's 16-bit data bus structure and features a dual-port 2K-byte data buffer. It is said to be Novell, Inc. Netware-compatible, and it offers software drivers supporting 11 jumper-selectable interrupt request lines.

The TC6046 costs \$549.

Thomas-Conrad, Suite 1C, 8403 Cross Park Drive, Austin, Texas 78754. 800-332-8683.

A token-ring repeater said to allow token-ring data to be transported over standard telecommunication facilities has been announced by Fiberlan, Inc., a BellSouth Corp.-Sicor Company.

The repeater, called **Token-gate**, allows two or more token-ring segments to be interconnected using a fiber-optic or microwave carrier system. It transparently converts any IEEE 802.5 signal operating at 4M bit/sec. into a 6.3M bit/sec. T2 signal for transmission. Alternatively, token-ring bridges can be used with Tokengate to

partition the overall system into a bridged-ring network.

Tokengate is priced at \$4,970.

Fiberlan, P.O. Box 12726, Research Triangle Park, N.C. 27709. 919-481-5000.

Local-area network software

TCP/Link, a fault-tolerant implementation of the U.S. Department of Defense Transmission Control Protocol/Internet Protocol (TCP/IP) suite, has been announced by Failsafe Computer Systems, Inc.

TCP/Link includes support for File Transfer Protocol, Network File System and User Datagram Protocol over an IEEE 802.3 baseband Ethernet local-area network.

TCP/Link runs on Tandem

Computers, Inc. machines and allows Tandem systems to be used as fault-tolerant file servers in a TCP/IP network.

TCP/Link is licensed for \$29,500 per node.

Failsafe, Suite 211, 2700 River Road, Des Plaines, Ill. 60018. 312-390-6660.

Customer-premise equipment

General Datacomm Industries, Inc. has announced the **Datacomm 19202** data set, with an integral dual-channel time-division multiplexer for synchronous or asynchronous operation.

Each channel can be set to offer individual rates of 19.2K, 16.8K, 14.4K, 12K, 9.6K, 7.2K, 4.8K, or 2,400 bit/sec. All options can be established using an 80-char. LCD on the front panel.

General Datacomm also announced **DATX**, a simultaneous data-over-voice system said to transmit synchronous or asynchronous data over existing telephone lines at up to 19.2K bit/sec. in half- or full-duplex mode with CCITT X.25 capability.

The Datacomm 19202 costs from \$4,250. DATX costs from \$335.

General Datacomm, Middlebury, Conn. 06762. 203-574-1118.

Links

Teradata Corp. has announced a version of its host software, the **VAX Interface**, said to allow Digital Equipment Corp. VAX systems to access a DBC/1012 Data Base Computer system across an Ethernet local-area network.

The VAX Interface consists of the Teradata Director Program system interface and Basic Teradata Query facility, Teradata's query and reporting product. Requests can be sent to the DBC/1012 interactively or in batch mode, and results can be received in a formatted report or in data files.

The VAX Interface runs under DEC's VMS or MicroVMS Release 4.4 or higher. Available for either Transmission Control Protocol/Internet Protocol or ISO's Open Systems Interconnect, the VAX Interface costs \$10,000 for the VAX 8000 series or \$4,000 for all other VAX products.

Teradata, P.O. Box 92117, 12945 Jefferson Blvd., Los Angeles, Calif. 90009. 213-827-8777.

Joiner Associates, Inc. and Simpact Associates, Inc. have announced an option to Joiner's Jnet NJE software for networking Digital Equipment Corp. VAX/VMS systems to IBM mainframes.

The product, **Jnet BSC Assist**, consists of software and Simpact's family of communica-

tions processors. According to a company spokesman, it allows users to off-load portions of the NJE protocol from the VAX to a Simpact processor.

The Jnet product costs \$6,100 for the Q-bus option, \$9,700 for the Unibus option and \$12,000 for the VAXBI option.

Joiner, P.O. Box 5445, 3800 Regent St., Madison, Wis. 53705. 608-238-9106.

Modems/Multiplexers

An error-correcting, autodial, 9.6K bit/sec. internal personal computer modem has been announced by **Data Race, Inc.**

The **PC-Race 96** features the vendor's asymmetrical full-duplex intelligent data compression/error correction technology as well as its BMX, half-duplex technology for file-transfer or block-mode applications. The interactive mode is user-selectable.

The PC-Race 96 is Hayes Microcomputer Products, Inc.-compatible and offers 32K bytes of on-board dynamic random-access memory. It is also compatible with Data Race's PC-Race 24 modem.

The PC-Race 96 costs \$795.

Data Race, Suite 108, 12758 Cimarron Path, San Antonio, Texas 78249. 512-692-3909.

Diagnostic equipment

A **T1 Channel Access Unit (CAU)** for T1 test and analysis has been introduced by **Digilog, Inc.**

The CAU is said to connect any Digilog or non-Digilog pro-

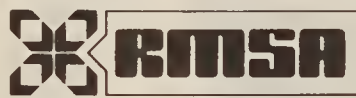


Digilog's T1 access unit

tol analyzer to a T1/DS1 link for testing DSO channels. It is said to provide access to any of the data or VF voice channels for protocol monitoring of drop-and-insert testing. It is controlled from the protocol analyzer's keyboard or a separate ASCII terminal. Simultaneous access to the transmit and receive sides of the T1/DS1 link is provided.

Both a version meeting domestic U.S. T1 specifications of 1.54M bit/sec. and a version for use with the CCITT G703 interface with line speeds of 2.048M bit/sec. are available; they are priced at \$1,795 each.

Digilog, 1370 Welsh Road, Montgomeryville, Pa. 18936. 215-628-4530.

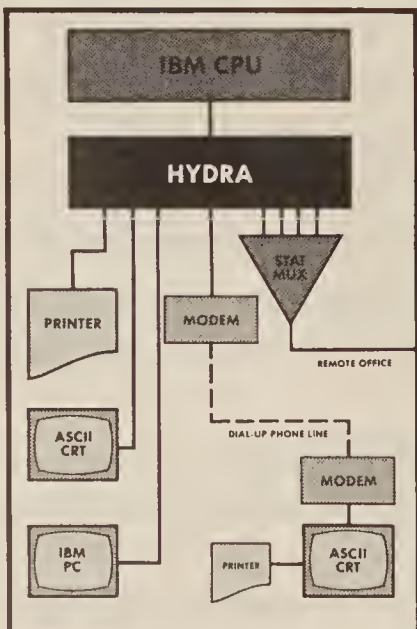
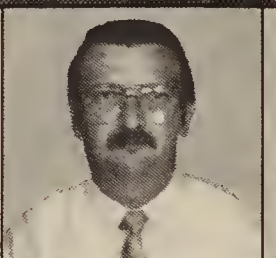


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AT&T RISCs all on Sparc



AT&T's move to the Sparc-Unix platform is a strategic retreat that AT&T hopes will put it on high ground for the next computing battle several years from now.

Faced with lackluster results in selling its 3B minicomputers and Unix personal computers, AT&T's Data Systems Group under President Vittorio Cassoni has embarked on a radically different strategy.

AT&T is moving away from its proprietary 32000 microprocessors to Sun Microsystems' reduced instruction set computing (RISC) architecture Scalable Processor Architecture (Sparc) chip. In addition, AT&T is collaborating with Sun to establish a new Unix standard that will merge the University of California at Berkeley's Unix 4.2, AT&T Unix System V and Sun's SunOS operating system.

The telecommunications giant's aim is to create an industry standard that it hopes will be as omnipresent as IBM's Personal Computer and compatibles.

Cassoni is trying to effect a cultural shift at AT&T, from a technology leader with relatively little marketing clout to a company that will get into the ring, make alliances and try its darndest to win.

For a company with a rich corporate tradition of innovation, it must hurt AT&T's pride to admit that it must look outside itself to succeed in the computer business.

But even with new alliances, AT&T will have to learn to sell to the commercial market, something that IBM mastered ages ago, and at which DEC has recently proven it is highly capable. AT&T will also face others that are highly successful in certain markets.

Per Flaaten, an industry analyst at Arthur Andersen in Chicago, offers the following observation: "AT&T has a lot of geniuses, but I don't see them having a lot of marketing success. Sun will benefit from the alliance, but AT&T won't be."

Continued on page 50

Curing computer room blues

McDonnell Douglas stacks gear three stories high in St. Louis facility

BY JEAN S. BOZMAN
CW STAFF

ST. LOUIS — When a company owns dozens of mainframes and scores of disk drives, it is not enough to plan a computer room. The company plans more than one, usually on several floors of a city high rise.

In 1980, McDonnell Douglas Corp., faced with the challenge of housing 15 mainframes and 24 minicomputers, decided to build a three-story "cube" as the central site for computers at its Information Systems Group (ISG) facility here.

The design, which was created by the St. Louis architectural firm of Hellmuth, Obata and Kassabaum, Inc., stands at the heart of McDonnell Douglas's ISG complex in the northeastern part of the city. The facility, administered by personnel from the \$1.2 billion ISG division, also houses computers that support the company's Aerospace Group. McDonnell Douglas's total revenue last year was \$12 billion.

Record holder?

McDonnell Douglas calls its cubic computer room the largest one in the free world. While that claim may be hard to prove, one sign of the facility's size is that IBM keeps six full-time field-service engineers on-site. There is even a water tower behind the building that provides chilled water to the computer rooms in case of emergency.

The facility houses printers

and plotters on the first floor, 15 IBM mainframes and 20 Digital Equipment Corp. VAX systems on the second floor and more than 400 disk drives on the third floor. A single cooling system wraps the building, with extensions to each raised-floor area. Cables and wires descend through vertical columns to make interfloor connections throughout the 150,000 square feet of raised-floor space.

"Rather than having equipment spread out, it's stacked on different floors," says Luke Abkemeier, director of production services for McDonnell Douglas's Information Processing Systems Group. "That allows us to get our CPUs closer together."

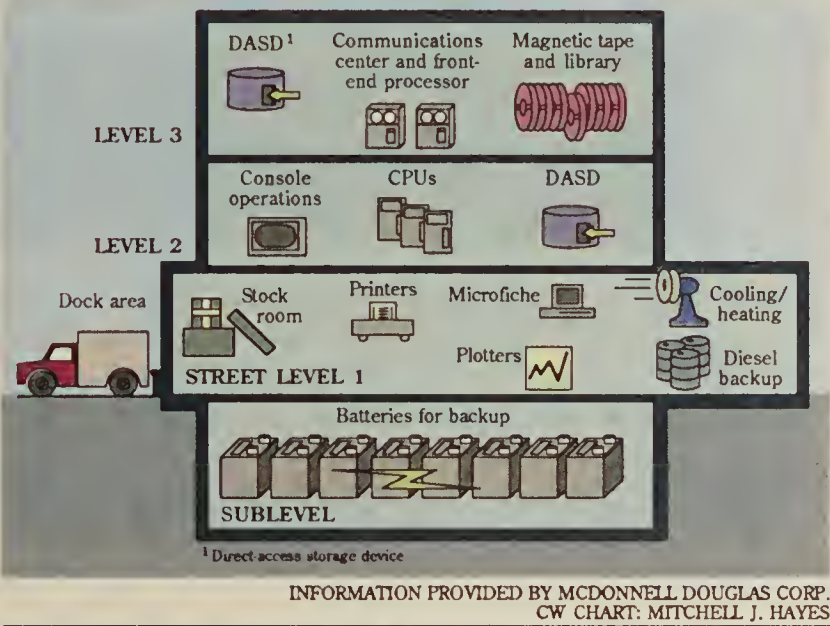
That proximity was necessary when the building was designed, since peripherals could be no further than 400 feet from IBM CPUs at the time, he says.

Proximity between neighboring CPUs, however, means little, Abkemeier says. An IBM 3084 for the company's ISG can be found alongside an IBM 3090 supporting the Aerospace Division. Across the computer room, a new Tandem Computers, Inc. VLSI system is next to a DEC Vaxcluster, but the two systems run different applications. The Tandem supports the company's electronic data interchange network under Tymnet, while the VAXs run applications for re-

Continued on page 50

Data center design

McDonnell Douglas credits building layout with data center efficiency



EMC cuts IBM upgrade kit prices

HOPKINTON, Mass. — EMC Corp. recently announced price cuts on all of the company's upgrade kits for IBM System/38 computers.

EMC said the specially priced packages include trade-in and trade-up credits allowing System/38 users to migrate to IBM's System/36 and 38 follow-on product, code-named Silverlake.

An EMC spokesman said the company has adopted a package pricing philosophy throughout its System/38-compatible product line.

Savings of up to \$40,000

The spokesman claimed the package pricing gives users savings of up to \$40,000 on standard model upgrades, which can mean a user receives what amounts to a free disk drive.

He added that EMC upgrade kits use IBM-supplied parts.

The package pricing structure expires Jan. 31.

In addition, EMC said it is accepting IBM 3370 disk subsystems in trade on a temporary basis.

Inside

- Applied Digital Data adds to Mentor 6000 multiuser systems line. Page 51.
- Xerox enhances desktop laser printer. Page 51.

KCR claims its nonimpact printers hold a clear edge

EAST HARTFORD, Conn. — KCR Technology, Inc. recently claimed a technology breakthrough for high-volume non-impact printers with a new type of electrographic technology.

KCR called the proprietary technology direct-charge deposition, a process in which a print head deposits ions on a dielectric belt that passes microinches off the head. The company said the process provides a clear distinction between the image and the background without smudging or streaking, and that the size of image dots remains constant.

The KCR Model 7601 Advanced Printing System was designed to support forms overlay and has the ability to scan, edit

and download preprinted forms. It is also said to allow creation of forms with line art, scanned logos, signatures and multiple- and special-font sets. It has a page-mapping function that allows customization of a printed piece when the user specifies multiple font styles on a page. A mail-merge function moves variable data, such as an address list, into a fixed document.

The printer was designed with a shortened paper path to minimize paper jamming and paper-loading time. KCR recommends continuous fan-fold 12-by 8½-in. paper, although other sizes can be used.

A basic printing system costs \$80,000.

Colorgraphic display out

Chromatics system based on Motorola technology

ATLANTA — Chromatics, Inc. recently started shipping its Le Mans colorgraphic display, featuring a microcoded implementation of the industry-standard Graphical Kernel System software.

The Le Mans system, which was announced in July at Siggraph '87, is based on Motorola, Inc.'s 32-bit VMEbus architecture. It can contain up to 32M bytes of display-list memory and up to 24 double-buffered bit-mapped memory planes.

The system interfaces to host computers including Digital Equipment Corp.'s VAX and Sun Microsystems, Inc. systems through a standard DR11-W interface, the vendor said.

According to a company

spokesman, the Le Mans colorgraphic system can draw one million fully transformed two-dimensional vectors per second and 250,000 fully transformed three-dimensional vectors per second.

The system is also said to generate 25,000 smooth-shaded polygons per second with hidden surface removal in 3-D applications.

Included with the Le Mans system is a 19-in. 1,280- by 1,024-pixel noninterlaced display monitor capable of displaying up to 16 million colors. An optional frame grabber is also available.

The basic unit costs \$24,440. A ruggedized version was announced last month.

Introducing the two on earth



The new COMPAQ DESKPRO 386/20™

The world now has two new benchmarks from the leader in high-performance personal computing. The 20-MHz COMPAQ DESKPRO 386/20 and the 20-lb., 20-MHz COMPAQ PORTABLE 386 deliver a level of system performance that can actually rival minicomputers'.

Plus they introduce advanced capabilities without sacrificing compatibility with the software and hardware you already own.

Both employ an industry-standard 80386 microprocessor and sophisticated 32-bit architecture. Our newest portable is up to 25% faster and our desktop is actually up to 50% faster than 16-MHz 386 PC's. But we did much more than simply increase the clock speed.

For instance, the powerful COMPAQ DESKPRO 386/20 uses a cache memory controller. It complements the speed of the microprocessor, provid-

ing an increase in system performance up to 25% over other 20-MHz 386 PC's. It's also the first PC to offer an optional Weitek™ Coprocessor Board, which can give it the performance of a dedicated engineering workstation at a mere fraction of the cost.

They both provide the most storage and memory within their classes. Up to 300 MB of storage in our latest desktop and up to 100 MB in our new portable. Both use disk caching

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and the new 20-MHz COMPAQ PORTABLE 386™

to inject even more speed into disk-intensive applications.

As for memory, get up to 16 MB of high-speed RAM with the COMPAQ DESKPRO 386/20 and up to 10 MB with the COMPAQ PORTABLE 386. Both of these computers feature the COMPAQ Expanded Memory Manager, which supports the Lotus/Intel/Microsoft Expanded Memory Specification to break the 640-Kbyte barrier even before OS/2™ is released.

With these new computers plus the original COMPAQ DESKPRO 386™, we now offer the broadest line of high-performance 386 solutions. They all let you run software being written to take advantage of 386 technology. *And to prove it, from now until December 31, 1987, we're including Microsoft Windows/386 Presentation Manager free with your purchase of any COMPAQ 386-based PC.* It provides multitasking capabilities with

today's DOS applications to make you considerably more productive. But that's just the beginning. For more information, or the dealer nearest you, call 1-800-231-0900, Operator 43. In Canada, call 416-733-7876, Operator 43.

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COMPAQ®

Gibson

CONTINUED FROM PAGE 47

cause they don't know how to sell."

Indeed, when IBM set out to establish a personal computing platform, it already knew how to sell. The computing community knew this, so the community developed applications and add-ons for IBM PCs, confident that one software program could find its way to thousands of computer screens.

Was Lotus's 1-2-3 written for IBM because the authors fell in love with the excellence of IBM's PC hardware or because it had Big Blue's marketing muscle behind it?

Do people feel the same way about

AT&T? Or Xerox, which announced support for the system shortly after the Oct. 19 Sun-AT&T announcement? Probably not. They can feel upbeat about Sun, which has shown nothing but success in selling computers, but which is still no IBM. It will take many more participants to make Sparc-Unix a success.

Further, when the IBM PC standard was established, there was a void in personal computing that Apple and a few others had only begun to fill. Is there a similar computing gap today?

Cassoni would say Sparc-Unix can offer desktop-to-mainframe computing, while all other hardware and operating system platforms leave the high or low end uncovered. But DEC offers a multiuser system for less than \$10,000 and is

pushing mainframes on the high end. IBM is shooting for a similar desktop-to-mainframe sweep, and Unisys seeks the same.

But Cassoni seems to believe he will have a technological lead for the next generation of computing. As he expresses it, everyone will have to declare some position on a RISC architecture in the next three years. AT&T is just doing that now.

Cassoni feels the moment is ripe for AT&T; he believes RISC offers benefits to Unix that cannot be offered on other operating systems.

A haven for the huddled masses

At its best, the Sparc-Unix platform could be, in relation to the computer market, what America has traditionally been

among nations: the haven for the huddled masses who are eager for a fresh start.

America's immigrants could not make it in their own countries, and many had little chance for success in America, either. But they proved in an open political and economic system, free of outmoded customs, they could bring their unique gifts to the world.

That sounds good. And AT&T would love to see that same phenomenon take place with Sparc-Unix in computing.

But immigrants and pioneers had no guarantee of success, only of opportunity. AT&T has staked its technology claim. Now it must find ways to improve productivity — and sell users on them.

Gibson is a *Computerworld* senior writer.

Computer room

CONTINUED FROM PAGE 47

gional Bell operating companies.

Support and maintenance are simplified by the three-layer arrangement, as they are in other corporations' multifloor computer rooms — whether on Wall Street or in Los Angeles's high rises. At McDonnell Douglas, a single power system, fed by two power lines, charges an array of 10,000 batteries under the computer room. The arrangement provides 45 minutes of continuous power in the event of an electrical outage. Four 950-kVA diesel generators in an adjoining building would provide continuing energy, Abkemeier says.

Personnel implications

Centralizing computer resources has personnel implications, as well. "This type of approach is heading toward the day when a small number of operators can run an entire facility," Abkemeier says. "We can get by with fewer people because each person learns how to run several types of systems. This way, people can back each other up." As it is, only seven computer operators work during the two prime shifts, and just five work during the third shift.

McDonnell Douglas has other computer facilities; the two largest are 30,000-sq-ft computer rooms in Dallas and Fremont, Calif. The Dallas facility supports some services provided by Tymnet and the Tymshare division, according to Abkemeier. The Fremont facility supports aerospace design work being done in California.

Each business unit owns, and is responsible for, its own machines in the St. Louis facility. The ISG owns no IBM 3090s, for example. It operates an IBM 3081 Model K, an IBM 3083 Model J, an aging IBM 3032 and an IBM 4381. The aerospace group owns and operates several 3090s.

Some machines are leased, and some are purchased. "We have to go through a fiscal analysis of everything we buy," Abkemeier explains. The analysis of current market conditions determines how a computer is acquired.

Computers that are no longer needed may be given to other divisions within McDonnell Douglas, Abkemeier says. Last month, the company removed six Control Data Corp. Series 170 mainframes. The applications on those machines have been replaced by others on a Cray Research, Inc. Cray-2 supercomputer and DEC VAXs.

The problem with most 4GLs is they're finished before you are.

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tions that would take hundreds of pages with C.

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NEW PRODUCTS

Processors

Applied Digital Data Systems, Inc. has added three members to its **Mentor 6000** line of multiuser systems.

The entry-level Model M6000-4/25 features up to 8M bytes of random-access memory, up to 280M bytes of unformatted disk capacity, a 1/4-in. streaming tape drive and up to 96 serial ports.

The Model M6000-6/25 offers a maximum disk capacity of 968M bytes, 1/4-in. and 1/2-in. streaming tape drives and up to 128 serial ports. The Model M6000-8/25 offers up to 16M bytes of RAM, 4.4G bytes of disk capacity, a 1/4-in. streaming tape drive, up to four 1/2-in. tape drives and up to 256 ports.

Enhancements to the Mentor 6000 Model 2 were also announced, including an increase in maximum disk storage capacity to 484M bytes and an increase in maximum ports from 48 to 64.

The Mentor 6000 Model 2 costs from \$19,500; the Model M6000-4/25 costs from \$45,000; the Model M6000-6/25 costs from \$91,000; and the Model M6000-8/25 costs from \$132,000.

Applied Digital Data, 100 Marcus Blvd., Hauppauge, N.Y. 11788. 516-231-5400.

Data storage

A ruggedized 3 1/2-in. Winchester disk drive, the **EDR-200**, has been announced by **Genisco Peripheral Systems**.

The drive is said to provide up to 40M bytes of memory. It is available with a small computer systems interface or the ST-506 standard Winchester disk interface.

Other features include front-panel shielding, an internal drive mounting and capabilities for built-in self-diagnostics.

The EDR-200 is priced from \$2,650 to \$3,950.

Genisco Peripheral Systems, 10874 Hope St., Cypress, Calif. 90630. 714-220-0720.

Terminals

Laserlynk, a cartridge-housed workstation enhancement feature for IBM System/34, 36 and 38, has been announced by **The Lynk Corp.**

Laserlynk is said to drive Hewlett-Packard Co. laser printers and compatibles as IBM 5219 word processing printers, using IBM's Displaywrite/36 or text-management software. The cartridge plugs into Lynkstation/912, 802 and 197C workstations and into the Computinglynk workstation.

Other features include the ability to

change print orientation from portrait to landscape on a page-by-page basis; manual, internal bin and external dual-bin feed methods; the ability to define up to eight special printer features; and the ability to send hex data from the host to the printer without translation.

Laserlynk costs \$695.

Lynk, 101 Queens Drive, King of Prussia, Pa. 19406. 215-265-3550.

Printers/Plotters

Xerox Corp. has expanded the paper handling capabilities of its **Xerox 4045 Laser CP** desktop laser printer.

Enhancements include four paper cassettes said to accommodate throughput materials including standard sizes and heavy stock. According to the vendor, the 4045 can handle pressure-sensitive labels and odd-size cards and paper. Also added to the printer were large signage fonts in nine sizes, ranging from 1/4 to 3 in.

Other features include 300 dot/in. resolution, speed of up to 10 page/min and bar-code capabilities.

The Xerox 4045 costs from \$4,995. The cassettes cost \$70 each.

Xerox, Xerox Square 06B, Rochester, N.Y. 14644. 716-423-5078.

A line of professional drafting plotters has been announced by **Houston Instrument**, a division of Amtek, Inc.

The **DMP-60** series features single-pen plotters that offer adjustable media size capabilities, English and metric media formats and support for such add-on options as multipen accessories, optical scanners and expanded buffer boards.

The DMP-61 has an axial pen speed of up to 32 in./sec. It produces drawings on 16 media sizes and costs \$4,695.

The DMP-62 handles 23 media sizes ranging from 8 1/2 by 11 in. to 36 by 48 in. It costs \$6,495.

The products feature multiple and filled fonts, closed-area fill capability, 10 character sets and a smooth curve-generating algorithm.

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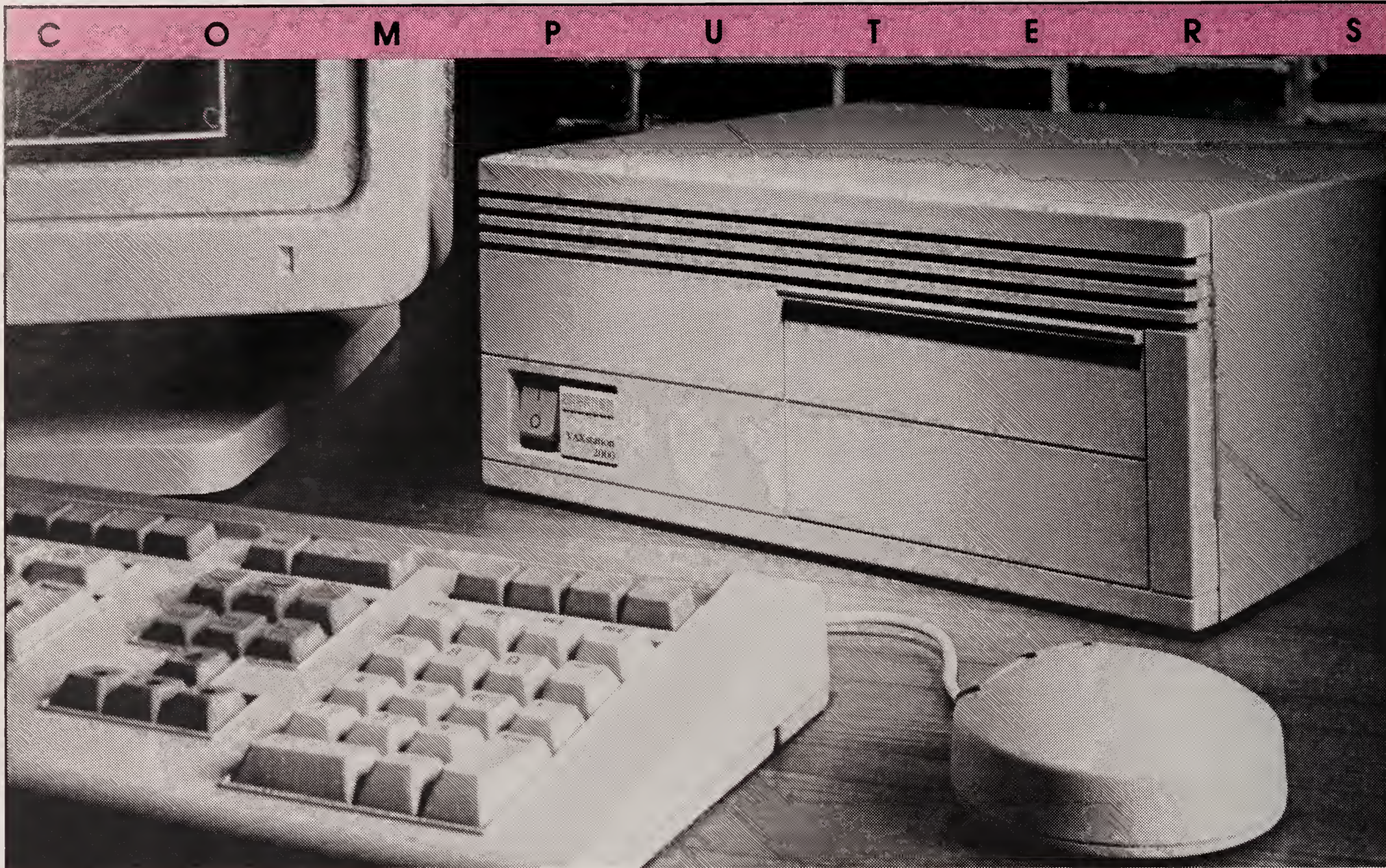
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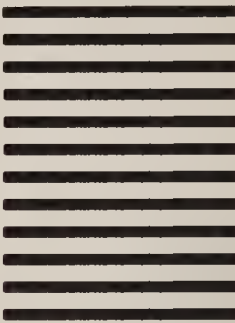
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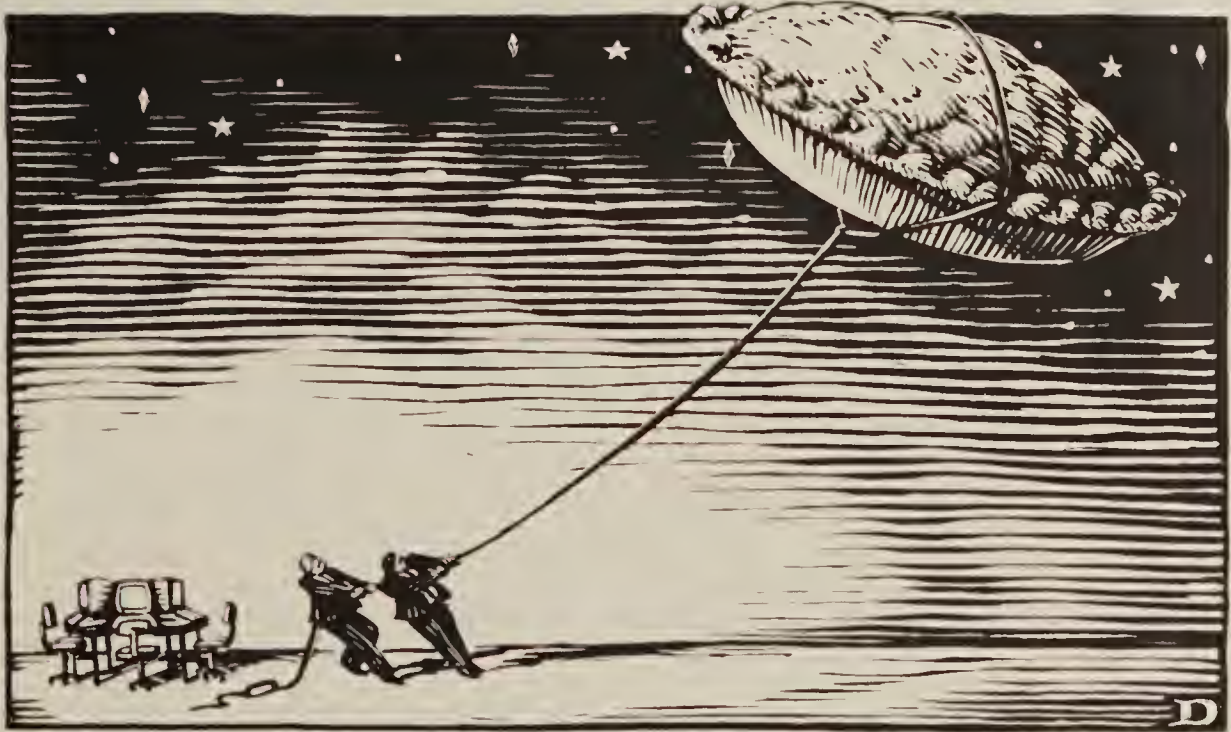
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Daring feats and dazzling effects are no longer holding the interest of the market, so AI is learning to mingle with other tools

AI JOINS THE WORKING WORLD

BY MICKEY WILLIAMSON



BOB DAHM

Remember 1987 as the year in which vendors of applied artificial intelligence products turned away from what one vendor terms the "Buck Rogers" aspects of the technology in favor of its more practical aspects. These are the terms in which Lee Hecht, chairman of Palo Alto, Calif.-based Teknowledge, Inc. described his company's new strategy in a 1987 annual report for the fiscal year ended June 30. In that year, Teknowledge achieved mid-six-figure profitability. The report contains two announcements: an operating loss of \$2.8 million and a new product line designed for integration with existing applications and data bases.

If the past year has proven a tough one for Teknowledge and the other members of AI's "Gang of Four" — Carnegie Group, Inc. in Pittsburgh, Inference Corp. in Los Angeles and Intellipoint, Inc. in Mountain View, Calif. — it has been no less so for vendors of AI-dedicated hardware.

Lisp Machine, Inc. in Lowell, Mass., turned up its toes in bankruptcy court and was acquired by Gigamos Systems, Inc. Symbolics, Inc. moved to palatial quarters in Concord, Mass., only to quickly move back to its Cambridge, Mass., starting place in hopes of augmenting revenue by renting out the Concord facility. Also in Cambridge, Palladian Software, Inc., maker of two high-priced expert systems that run on dedicated LISP machines, laid off a sizable portion of its work force in a concerted life-saving effort.

Such events may turn out to have been the alarm needed to awaken the AI industry to the reality of the marketplace, which is that current purchasers are not interested in AI for its own sake. The mood of the market is summed up by Michael Gaffney, technical specialist at McDonnell Douglas Corp. in St. Louis and president of Users.PRL, an organization of users of Level

Five Research, Inc.'s Insight expert system software tools. "AI can't survive as a stand-alone technology. It shouldn't survive," Gaffney says. "It should be part of MIS and the way they do business."

Applied AI, the most familiar in the form of expert systems, is, after all, only another software tool. Assembly language was supplanted, but not entirely replaced, by Cobol and Fortran for application development. Procedural languages were superseded, but not eliminated, by data base technology and fourth-generation languages. So AI technology is starting to find a place in the developer's tool kit as one more way of managing an organization's information system requirements.

AI brings significant value to the effort. For one thing, it can make systems easier to build and maintain. George Hairston, founder and president of AI Services Co., a New Haven, Conn., consultancy, describes one retirement and benefit system he knows of as a "patchwork quilt" reflecting 15 years' worth of changes in government regulations.

"These regulations," he says, "are really rules from the government." Employing rule-based expert system technology, he explains, now makes it possible to reflect changes without having to change the system's logic, with clear savings in maintenance expense. The same techniques could hold for any application in which

Williamson is a technical journalist based in Warwick, Mass.

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the type of data remains constant but in which the logic applied to it changes over time.

Another benefit of AI technology is its ability to point out logic errors in existing practices. Data General Corp. in Westboro, Mass., while deciding whether to offer Cambridge-based Gold Hill Computers, Inc.'s Goldworks expert system generator to its customers, built a trial application of its own to test the software product.

It recoded a 15-year-old Cobol transfer pricing application, which applies changes in company policy and prices to determine how DG prices the products it sells to its overseas subsidiaries.

Running the Cobol and Goldworks applications concurrently, DG found logic errors in the Cobol system, which MIS had adjusted to reflect changes in policy and conditions throughout the years by gluing on new chunks of Cobol code.

Then, says Gerald Barber, Gold Hill's vice-president of research and development, the decision was made to write the entire transfer pricing policy in Goldworks and have DG's experts evaluate it. They did and found inconsistencies in the way the policy had been applied.

Application development can benefit from applying AI technology, as Michael A. Harter, project director at Provident Life and Accident Insurance Co. in Chattanooga, Tenn., demonstrated.

At Provident, the information systems organization utilizes an expert system in order to write program specification blocks (PSB) for applications that must access the corporate data base.

New PSBs have been written, Harter says, in Cobol by a systems programmer on request from an programmer. "The applications programmer has a good idea of what information is in the data base but doesn't necessarily know how it's [arranged] there," he says.

'One man-year per year'

Now, after an interactive question-and-answer session, the expert system applies its knowledge of the data base to the task at hand and creates the control block — a far cry, Harter notes, from having to call systems programming and then wait a week or so until they could get to it.

Starting in 1988, he says, he expects the PSB generator to save his company "one man-year per year, every year."

Having Palo Alto-based Aion Corp.'s Aion Development Sys-

tem (ADS), an inference-based development tool, made the difference, Harter says. For years, the Provident systems team's action plan had a PSB generator on its moderate-priority list, but "nobody wanted to undertake the activity," he explains.

"It probably wasn't cost-justified to be written in Cobol. There would be logic-maintenance problems, and somebody would have had to build all the screens." ADS, he says, provides default screens, and its inference engine aids in logic updates.

Expert systems technology focuses on the user, Gaffney points out, while MIS traditionally does not. "A merger of these two technologies will really take the MIS field a long way," he says.

Using AI techniques will allow development of "systems that literally know what users want, screens that make users feel comfortable," rather than the blank-screen, blinking-cursor, unfriendly environment that is typical of mainframe systems," he adds.

Currently, one of the brightest stars in AI technology's crown is the American Express Co.'s Authorizer's Assistant (see story page S7). Working on-line at the American Express Fort Lauderdale, Fla., authorization center, the expert system ad-

To be effective, such a system needs access to the customer credit history data base, as well as to company policy and procedures information. It must offer a mechanism for reasoning about the current case as well as being available to many people at once on a networked system.

No system is an island

None of these benefits would be possible with an AI technology that is required to dwell in splendid isolation on dedicated hardware running segregated software.

"In the business world, it's just about impossible to avoid having to use data base technology," says Guy Howard, a principal in Expert System Design, Inc., a Berkeley, Calif., company specializing in embedding AI technology within data base management systems.

Recently, the firm delivered such a product to Wells Fargo Leasing Corp. Running on an Intel Corp. 80386-class personal computer, the system is written in Nantucket, Inc.'s Clipper, an enhanced language in Ashton-Tate Corp.'s Dbase III specification, and has an inference mechanism built in Level Five Research's Insight 2+. The system's function is to establish the value of equipment when a lease expires.

Accurate setting of residual values is key to a leasing company's profits and the task of a single expert within Wells Fargo.

To aid in this, Howard and his partner, Robert Hink, built an application that is, Howard says, "about 25% expert system and 75% data base management." The goal, he says, "was to free

[the expert] from spending time on low-level deals so that he could concentrate on the big ones."

Although the system is only about 2 months old, early signs indicate that the goal has been met. Now, instead of needing about half a day to determine a single residual in a routine case, the expert does the same job in a minute and a half.

Howard is now working on a networked version of the system so it can get equipment data directly from the corporate data base; the current method involves quarterly updates in the form of downloaded ASCII files.

The tie that binds

Not only can expert systems technology provide the glue that joins human expertise with existing corporate information, it can also be the bridge between disparate kinds of data base systems. Taught the requirements of various data bases, an expert

Continued on next page

Collecting shells for rapid prototyping

BY ED LEARY



BRAD MARKEL/GAMMA LIAISON

My interest in AI started in 1983. I knew absolutely nothing then about artificial intelligence or expert systems. Then I got a brochure in the mail that said I could buy a LISP interpreter for only \$35. LISP, of course, is one of the more popular languages for coding AI programs. I sent in my order, and in a few weeks I had my LISP software.

Soon after, I read an article that mentioned an expert system that I could buy for only \$95. In a short time, I was the proud owner of my first expert system. I read through the instruction manual, and in a few hours I had a simple expert system that could make decisions based on the information I gave it.

The majority of expert systems being sold today fall into the category of expert system shells. An expert system shell provides the generic parts of the expert system. One portion, usually called the human interface, structures questions and explanations for the human user. Another part, the inference engine, takes the problem to be solved and leads it through logic to a final solution.

The final part, the knowledge base, is the only portion of the expert system that must be provided by the user or some expert in a specific field. You merely tell the system in simple English-language statements the following:

- What problem you want the system to solve.
- Possible solutions.
- How to get from problem to solution.

Here's what a portion of the knowledge base looks like in an

expert system shell:

Goal — Identify this animal.

Rule — For identifying a cat:

IF the animal is fur-bearing
AND the animal gives milk
AND the animal has sharp teeth
AND the animal has sharp claws
AND the animal's sound is a purr or a roar

THEN the animal is a cat.

While the more powerful expert systems are not always this easy to use, most of the knowledge bases that contain the application expertise use logic similar to the example above and are fairly easy to follow and design.

The real strength

Software shells perform a variety of tasks. Word processors edit a body of text. Spreadsheets process any matrix of numeric values. Data base management systems maintain any large bank of a data or file. Now we have software that will perform non-numeric logic and approximate an expert's decision-making logic in almost any field of expertise.

Only after developing several useful programs using expert system shells did I realize the real strength of these programs. It's not that they are intelligent. Most shells don't display any more intelligence than traditional software does. A shell's real usefulness is for rapid prototyping. In my experience, writing a program in LISP or Prolog — or probably any traditional language — takes approximately 10 times longer than developing the same program with an expert system shell.

The fact that an expert system shell, purchased for less than \$500, can rapidly test the feasibility of automating virtually any application has significant implications. I have seen millions of dollars spent on feasibility studies that could not approach the predictive accuracy of a good prototype. •

Leary, a computer scientist for AI projects at the U.S. Social Security Administration (SSA), is associated with the Technology Assessment and Forecasting Group, which researches leading-edge computer technologies for future SSA systems.

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system could filter or modify information from one system, making it available for input into others.

The user, says Gold Hill's Barber, might well be unaware that an expert system is involved at all. "Once they are installed, expert systems don't look much different. Their value is that they solve a problem, not that they are using rules," he says.

To be sure, there will always be a place for stand-alone expert systems. Campbell Soup Co. in Sacramento, Calif., didn't need data base access to encode the expertise of Aldo Cimino, the company's retiring expert on soup cooker maintenance. But an increasing sophistication in the user community is driving the shift in emphasis, Barber says.

Technology push

"When users see what an expert system can do, they want it to do more," he notes. "The first thing they say is, 'This would really be very powerful if it could directly access the data or the spreadsheet or the application.' That's what's really exciting to them."

"The market is dragging everybody kicking and screaming to embedded [AI] applications," says Larry Geisel, former president of the Carnegie Group, who left to start the Intelligent Technology Group in Pittsburgh and build intelligent interfaces to popular PC-based software.

Intelligent Technology Vice-President Paul Haley, an Inference Corp. alumnus, adds, "The big issue for sales is, 'What can you deploy this thing on, and can it link with my existing software?' These are issues that both of us experienced in our respective Gang of Four companies."

Many of the AI industry's recent troubles stem from an orientation that pushes technology rather than responds to market demand.

Susan Messenheimer, president of AIM Publications in Natick, Mass., says, "MIS and DP professionals weren't thrilled with yet another technology that wouldn't incorporate into what they already had and that, therefore, would cause more problems instead of relieving them."

Until recently, says James Clancy, director of engineering and marketing at Gigamos Systems, which makes Picon, a real-time process monitoring and control system, expert systems were commonly seen as "a solution looking for a problem."

By last summer, most high-end AI products — stand-alone workstations and expensive software — that could be sold had been. Most of the money came from the U.S. government's

Strategic Computing Initiative, and most of the purchasers were buying technology, not business solutions.

The further a vendor's sales representative got from research and defense-related organizations, the harder it became to sell exotic AI products.

The message became clear. "People want to take advantage of this technology in the framework with which they are familiar — their existing information systems framework — and with the equipment and skills on hand," explains William Martorelli, senior analyst at New Science Associates, Inc., a South Norwalk, Conn., strategic planning and market research firm.

Still, he says, "We know more places where they'd like to see it happen than where it is actually happening. This business of embedded AI is younger than the expert systems marketplace itself."

Stay tuned

This situation may well change in 1988. The first wave of acquisitions, joint marketing agreements and product announcements may be over, but there are more to come. So far this year, Gold Hill has announced marketing agreements with DG, Wang Laboratories, Inc., Honeywell Bull, Inc., Prime Computers, Inc. and Symbolics. Digital Equipment Corp. did the same with Neuron Data, Inc. and that company's Nexpert expert system generator.

Cullinet Software, Inc. acquired Distribution Management Systems and a line of Cobol-based expert systems for order entry and related functions.

Information Builders, Inc., New York-based vendor of the Focus DBMS, bought Level Five Research and its Insight line of expert system generators, which will reemerge later this year as Level Five, presumably with a mainframe link.

Messenheimer expects to see many of "the better AI tool companies" being purchased by major mainstream hardware and software corporations in the next year to 18 months.

"A lot of them will do what Cullinet did," she says, "that is,

have a small AI group in an R&D center, discover that it is very costly and time-consuming to develop the technology themselves and go out to buy some of the smaller, but stable, well-devel-

machines operating under MVS and VM using IBM's Lucid Common LISP. Under the agreement, IBM will exclusively distribute the IBM mainframe version of KEE, which will carry

tium of four major companies that participated in its development. Harris says the product's ability to work with data coming out of SQL or IBM's DB2, as well as VSAM files or sequential files, is designed to accommodate actual user patterns of mobility. "People are continually moving from one data base system to another," he says.

Making AI fit

Impediments line the road that leads to full use of AI technology. Key factors in implementation are connectivity, processor speed and standardization. And the fact is, McDonnell Douglas's Gaffney says, "AI technology is ahead of our ability to make it communicate with the rest of the automation world."

Although the situation is changing, the fact that the most advanced system development tools still run on dedicated LISP machines causes problems for potential corporate users. Provident's Harter says his company would like to build an expert transaction-processing system, but "stand-alone LISP-based machines don't make any economic sense."

"We can't have processes stop while we transfer information over to some little machine that does its specialized thing and then sends us something back," he says. "First of all, IBM makes it very difficult to get in and out of their box, in terms of communications, and that just compounds the problem you inherently have anyway."

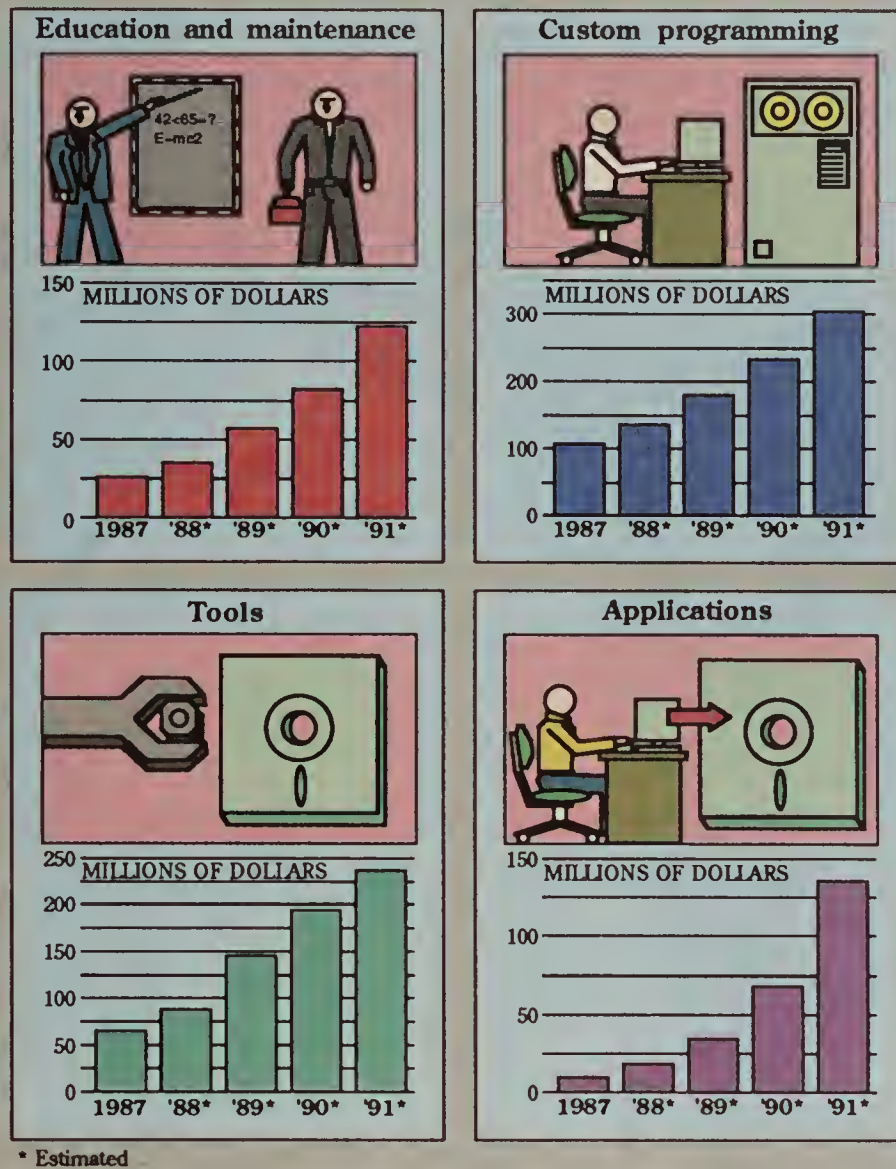
Speed is another issue, says Howard, joint builder of the Wells Fargo expert system. Typically, systems talk with each other using disk files — a method not acceptable on a machine slower than one based on the Intel 80386 microprocessor chip, he says.

Where inferencing is to be performed on the mainframe itself, Martorelli says, performance requirements should be taken into account. "Rule-based processing consumes machine resources, and that is an issue users must consider," he says.

"If they are going to add expert systems into their mainframe applications mix," he adds, "they have to plan for what could be a disruption." Martorelli adds that performance is likely to increase.

Standards are important where government contracts are concerned, Messenheimer notes. "Anyone who deals with the U.S. government has to deal with consistent interfaces and hooks to external data bases. That is something about which the government is demanding, and they see AI as a way to do that," she says.

Conversations about technological limitations inevitably lead to talk about 32-bit 386 machines and the anticipated operating system codeveloped by

Trends in expert systems software expenditures
Distribution of investment through 1991INFORMATION PROVIDED BY NEW SCIENCE ASSOCIATES, INC.
CW CHART: MITCHELL J. HAYES

oped companies."

She also says the first real products that will make people "understand what is so exciting" will emerge from DEC, IBM or Cullinet within the next year. "Between them, DEC and IBM have built probably 150 expert systems," Messenheimer says. "Now they're trying to figure out how to make products out of what they are using internally."

New Science's Martorelli says the push is on to embed expert systems in data base applications, and "the terms 'embeddable' and 'IBM mainframe' really go together."

That's why, he says, Teknowledge announced the Copernicus product line for expert system development on the IBM mainframe. It's also the reason IBM signed on to market Lucid Common LISP for its machines and will shortly bring out a version of PL/I with expert systems extensions for rule-based processing.

Late last month, Intellicorp signed an agreement with IBM to develop a mainframe-based version of Knowledge Engineering Environment (KEE), Intellicorp's expert system development tool, to run on IBM 370

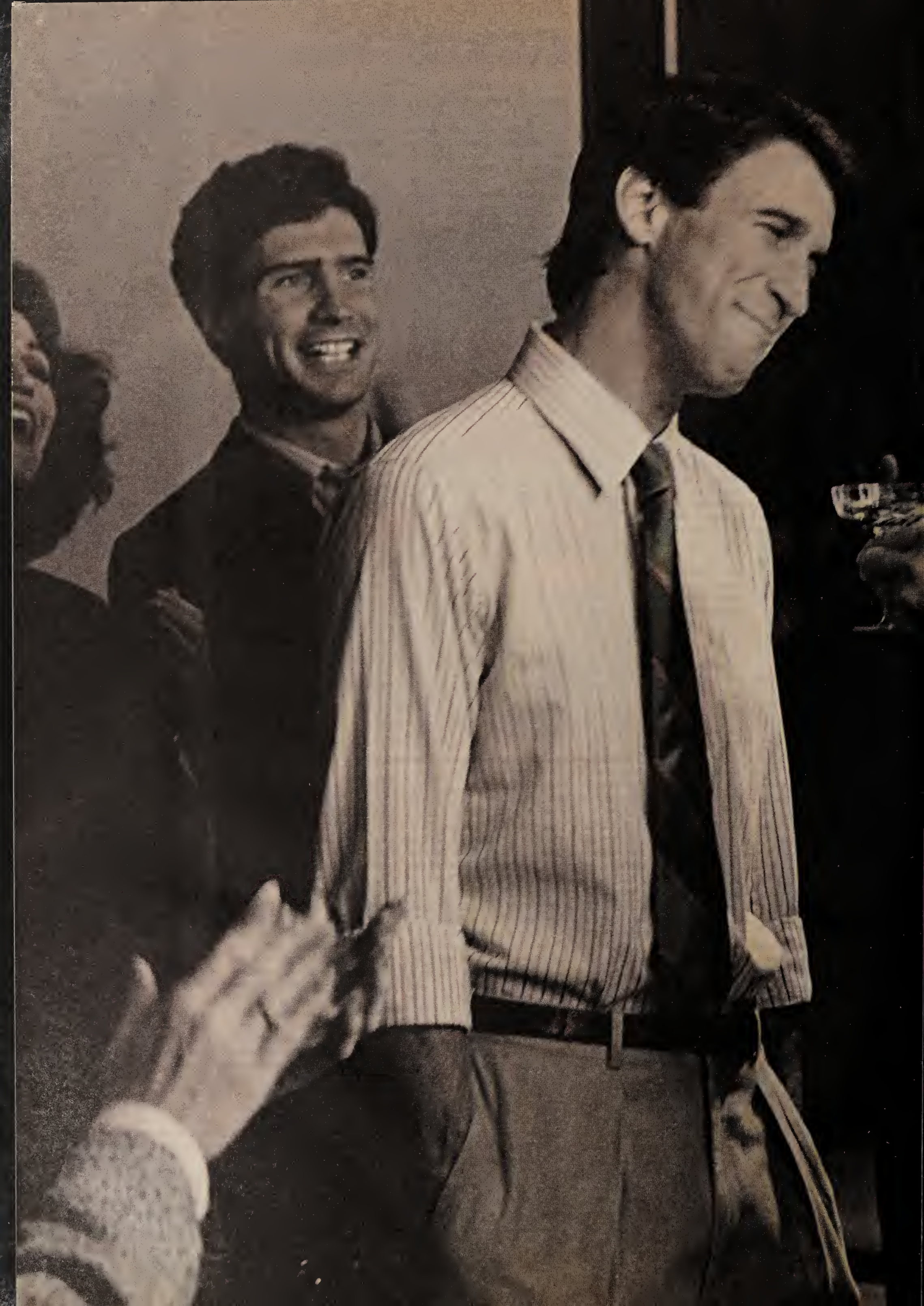
the IBM logo.

The affinity between embedded AI and mainframe data bases is behind Intellicorp's plans to ship two new products to sit on top of KEE.

One of those products, KEE Connection, will link dedicated LISP machines and workstations, including models based on Intel's 80386 chip, with mainframe relational data bases, says Michael Williams, Intellicorp's vice-president of product development. Rounding out the offering is Intelliscope, an intelligent browsing device that will help users formulate complex, analytical questions.

Artificial Intelligence Corp. in Waltham, Mass., was following the same line of thought when it developed its Knowledge Base Management System (KBMS). The system, scheduled to be released next year, provides a mixture of AI programming paradigms and hooks into any major mainframe environment so it can work with several data base systems simultaneously.

At Artificial Intelligence, founder and Chairman Larry Harris says KBMS is currently being alpha tested by a consor-

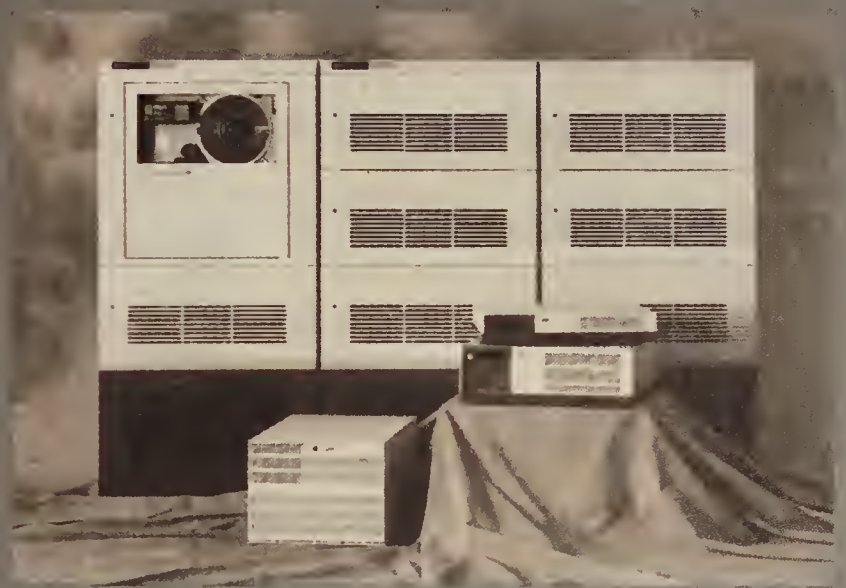




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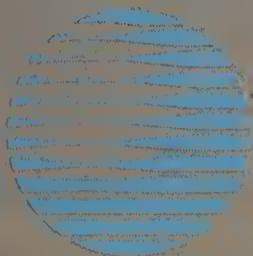
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IBM and Microsoft Corp., OS/2.

Some 2,200 software builders have each paid Microsoft \$3,000 for a software developer's tool kit containing a beta version of the operating system, programming tools and admission to a seminar on developing applications under OS/2.

Howard says OS/2, with its ability to run multiple systems concurrently, will permit easy integration of inferencing and the data base components of expert system development, something he says current systems lack. He integrated Insight 2+ with Dbase III, he explains, because despite the difficulties inherent in passing parameters between packages, he obtained the functionality he needed. Under OS/2, he adds, "two stand-alone products will talk to each other with relative ease."

"MY PERSONAL view is that OS/2 is what sets the stage for the business we're in."

MICHAEL WILLIAMS
INTELLICORP, INC.

Intellicorp's Williams is even more enthusiastic. "My personal view," he says, "is that OS/2 is what sets the stage for the business we're in."

Once upon a time

To Martorelli, IBM's description of Systems Application Architecture (SAA), the product that promises distributed processing with applications running across

the whole range of machines, suggests that articles such as this one will be anachronisms a few years from now.

"There's a possibility that expert systems technology will become so much a normal part of systems development that it will no longer be recognized as something separate and unique," he says. In addition, he says, SAA may well "remove the rationale for running expert systems

on the mainframe, but that day is not here, and I don't know when it will be."

Clearly, the market is not holding its breath waiting for that kind of integration to add expertise to its data bases. Williams says some of Intellicorp's customers are so eager to link data base knowledge with expertise that they have demanded beta versions of KEE Connection and Intelliscope. "There's a vigorous pull from the customer base," he notes. "We've had to give them beta versions and support them with application services."

In fact, Williams adds, one customer, Nokia Information Systems in Helsinki, Finland, has actually delivered an intelligent computer-aided design system written in KEE, using the beta version of KEE Connection to provide relational data base access. "They're frightening us," he says. "We told them, 'Don't do that,' but they went ahead with the understanding that they will have to migrate to the real product when it becomes available."

The more data, more valuable

The ability to hook into an existing data base may lead to a change in expert system development methodology in which the emphasis is on data rather than rules. Users find that even simple expert systems have significant value when they have masses of data to work with. And immediate access to the data base speeds development because when you can look at the data it is easier to see the relationships on which the rules are based.

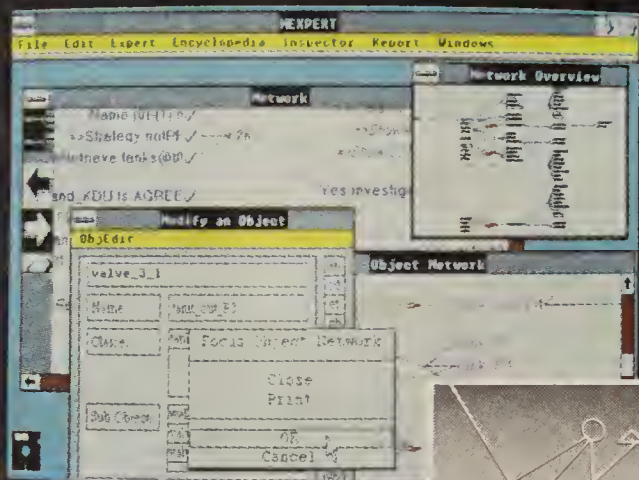
One Intellicorp customer is aiming at something of a speed record — 60 days to develop an expert system for the military and have it ready for a finished demonstration. "Both we and they have real confidence that they can get their software running in time," Williams says. "They have all this information stored in a relational data base, and all they have to do is build a connection mechanism."

If data base applications have traditionally been back-office systems, data base applications with intelligence embedded will be front-office applications, observers say. The difference is that back-office systems are highly ritualized, algorithmic and data dependent.

Front-office systems require more flexibility; they must work even when data is missing or uncertain. They have to adjust to rapidly changing conditions — policies, regulations, interest and exchange rates, for example. And they must be easy to use. Managerial users have neither the time nor the patience to learn SQL and the etiquette of conversing with

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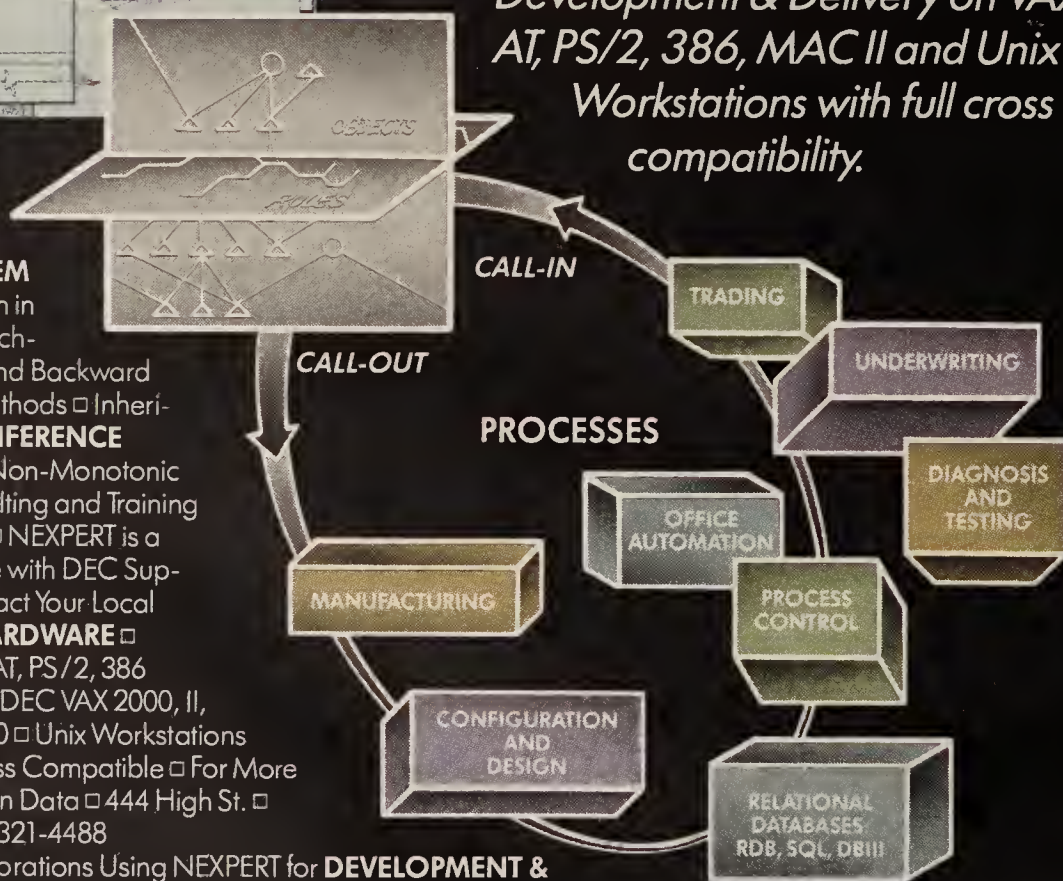
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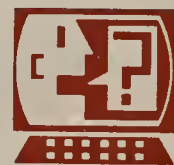
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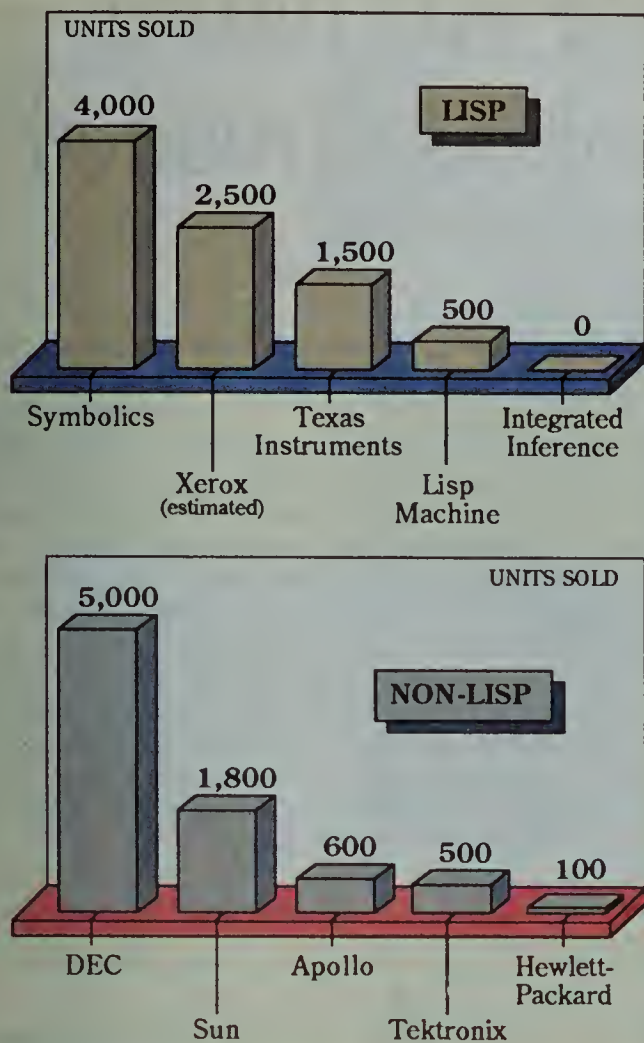
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LISP machines vs. non-LISP machines sold for artificial intelligence applications

Unit sales for major vendors in both categories through May 1987



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a data base. AI technology offers answers to both requirements.

AI Services' Hairston faults the AI industry with failing to clearly demonstrate AI's specific MIS benefits. MIS executives, he says, should first evaluate the technology in terms of its worth as a software development tool that "might help to more rapidly put applications in place, cutting back on the backlog and enhancing maintenance capability. The expert systems industry has been remiss in not emphasizing this aspect enough and in over-emphasizing the classical expert systems aspect," he says.

That's probably why Hairston, at a recent presentation on expert systems, found that only about five out of nearly 100 MIS attendees were actively engaged in some form of AI activity in their own departments. "They are interested," he says. "But they're still reading and disbelieving the fact that you can create an expert system that will make all those top-management-type judgments."

But if MIS isn't involved, someone must be; Gold Hill's research says at least 80% of Fortune 500 companies have projects under way, most in the planning or prototype stage.

Artificial Intelligence's Harris says that MIS executives need to recognize that AI programming paradigms offer "some very easy wins. They can give you a new slant on an old problem. Some problems that used to be very hard become tractable, and they are often in strategic areas

of the company."

At Wilmington, Del.-based Du Pont Co., AI program manager Ed Mahler is reporting paybacks of 15 to 1 on several of the more than 200 expert systems already in use. "Where else can you turn to get those kinds of returns?" Harris asks.

Second wave coming

Once an MIS manager's interest is piqued, Harris recommends a technology transfer project, using any one of the dozens of expert system development tools currently available. It doesn't matter which development system is chosen, he says. Almost any of them can suffice to get the department up to speed.

At the same time, managers should be aware of the second wave of AI products poised to hit the market. These, Harris says, "are much more in tune with the commercial environment." Some vertical-market applications, particularly in the financial services and insurance industries, may also be of interest.

But the most important thing, he says, is "doing the technology transfer and getting the ability to be self-sufficient with it so it can be one of the options they have for building applications."

Let there be doubt no longer: Driven by the demands of the commercial market, AI technology will soon become an important part of the MIS tool kit. By 1990 it will be taken for granted, in much the same way that data base technology and fourth-generation languages are today. •

Giving credit to an expert system

BY PAUL HESSINGER

A reasonable barometer of the success that can be anticipated from an investment in expert system technology is the experience of other organizations. One notable example is the credit card division of American Express Co.

American Express's Authorizer's Assistant expert system supplements more than 300 authorizers in four domestic centers that operate 24 hours a day. Although the existence of this custom-built expert system has been common knowledge in the industry for some time, the company only recently began to discuss its real functional and financial impacts.

The genesis of this project was not American Express's interest in expert system technology. The project was started because of a need to apply automation to a basic element of American Express's business in order to improve efficiency and continue to provide support to the company's fundamental business objectives. Although Authorizer's Assistant must still overcome some technical constraints, indications suggest the system is currently serving its objectives well.

Authorization issues

American Express's reputation as a well-run, aggressive marketing — but customer service-driven — enterprise is at the core of its success.

The organization's credit cards are unique in that they do not assign preset credit limits to cardholders. The acceptability of every charge must be determined dynamically as a transaction occurs. The major issues associated with credit authorization are the following:

- Fraud, such as using a stolen card.
- The cardholder's inability to pay; for example, consistent delinquency or an excessive outstanding balance.
- The loss of business because of an improper denial of a customer's credit.

Several years ago, American Express put an automated IBM MVS/XA mainframe credit authorization system (CAS) in place to resolve many simple credit approval transactions without human intervention.

However, by mid-1985, as its cardholder population grew, the

company faced a double-edged problem. On one side, the volume of fraud and credit losses continued to be significant, and a substantial portion of the losses were resulting from faulty authorization decisions.

Meanwhile, the growing volume of card use forced American Express to add additional human authorizers. These authorizers would intervene when CAS encountered a complex transaction or when the transaction volume began to exceed the system's capacity.

The second problem would exacerbate the first, as less experienced authorizers approved

A MERICAN Express's decision to implement the expert system did not emerge from any particular interest in AI. It based its decision on a return-on-investment analysis.

transactions that an "expert" authorizer would have rejected.

That is why the expert system project that resulted in Authorizer's Assistant was initiated in November 1985.

The anticipated benefits of the expert system included more consistent decision making; a reduction in credit and fraud losses; improved service, both perceived and real, to merchants as well as cardholders; control of, if not reduction of growth in, the operating expenses associated with the overall processing of credit cards; and a shortened learning curve for new authorizers.

Because American Express retained the services of Inference Corp. to develop the expert system using Inference's Automated Reasoning Tool (ART), the credit card company did not need to work through learning curves.

Defining the rules

A group of expert authorizers provided the basis for the rules embodied in the ART knowledge base. Inference chose a prototype approach that dealt with only the "green card," the basic American Express card, and involved the definition of 520 ART rules. The firm vigorously validated this system by applying it to actual case data and then com-

paring the results, tuning the ART rules as necessary.

From April through November 1986, validation continued until the expert system had grown to 850 rules with a very high degree of accuracy. Static evaluation of the actual data demonstrated a 76% reduction in bad authorization decisions; the expert system was accurate 96.5% of the time, compared with 85% for an average human authorizer.

A subsequent phase, from November 1986 through February 1987, involved the integration of the stand-alone system into the actual CAS environment. The system successfully completed this phase and has been in use ever since.

Authorizer guide

Functionally, the Authorizer's Assistant is transparent to the authorizer. The product reduces 12 screens of data to two screens of relevant information. The system recommends approval, denial or recourse to further information. Authorizer's Assistant also updates recommendations when questions are answered.

The expert system can additionally guide the human authorizer through conversations with merchants and card members.

The system has been very successful functionally, according to the company, although there has been some disappointment with performance, a situation that American Express says it hopes to rectify with a tighter integration between the expert system and the corporate mainframe.

In April, 2,500 cases were monitored as they were processed by Authorizer's Assistant and a human authorizer. The expert system logged 33% fewer credit refusals. Of the credit denials made by both, the expert system identified 100% more cases that resulted in collections. In terms of approvals, the expert system tallied 50% fewer cases that could be judged questionable.

American Express's decision to begin an implementation of the expert system did not emerge from any particular interest in artificial intelligence. The company based its decision primarily on a return-on-investment analysis that demonstrated an internal rate of return from productivity improvements in the range of 45% to 67%.

The expert system was calculated to be capable of autonomously resolving 20% to 35% of authorization transactions, realizing an average 20% improvement over the efficiency of human authorizers and an average 20% improvement in service time to card members and merchants. Overall, American Express expects a full recovery of its investment in a little more than a year. •

'C' as in 'Commercial'

BY DANIEL GROSS

As artificial intelligence has evolved from an academic curiosity to a commercially viable technology, the rules of AI programming have changed. Specialized languages like LISP and Prolog still dominate academic research environments, but in commercial AI, business considerations make these languages less than ideal.

In commercial programming, AI or otherwise, the C language is the favorite by a long stretch. The actual definition of the language is very concise, making it easier to implement compilers for C than for other languages. The Spartan definition of C has also produced more than usually precise standardization among different implementations, giving it that magic power software developers demand — portability.

The most important trend in commercial AI development right now is the broadening of the target population of users and, by extension, of machines. The market for AI applications is still small, and any computer may be the target for running an AI program. The only way to make the AI user market worthwhile is for developers to offer their wares on a variety of machines.

"Intercomputer portability is terrific with C. It exists on all machines. If you write a program, even in Basic, it's much more complicated to port it than in C," says Benoit de Maulmin, international marketing director of Infogrames, a telematics software development firm in Lyon, France. "The advantage is flexibility. You can change configurations without any problems."

What matters, according to de Maulmin, is not whether C is officially an AI language but whether it produces the required results. "We could have used LISP or Prolog," he says, "but what really interests us is to be able to adapt to our customers' needs."

As AI becomes serious business, AI applications are expected to match the functionality of conventional programs. Sometimes, straightforward features such as file compatibility, context-sensitive Help and compatibility with standard windowing environments are much more easily implemented in traditional languages. "Once you have any

rich language, you can construct solid inference algorithms that will work just as well," de Maulmin says. "LISP and Prolog are constraining because they are limited to AI functions."

John Girard, an analyst who works on in-house expert system development at Pacific Bell, says the advantages of programming in C are very real. "On our first project, we had a proposal from one major AI software development vendor that used LISP. The sales reps told us it would take more than a year to get the project off the ground. They would have to produce it,

THE MARKET for AI applications is still small, and any computer may be the target for running an AI program. The only way to make the AI user market worthwhile is for developers to offer their wares on a variety of machines.

we couldn't maintain it, and it would cost more than a million dollars," Girard says. "So we found an expert system shell written in C and built a system in six months with three people at a cost of less than \$100,000."

Girard and his group coded all the user interfaces and data base calls in C. The resulting application runs on both PCs and Unix machines. "It's an almost painless process," he says, "to port it in either direction."

Not for everyone

C is not always the language of choice for every kind of AI software development. LISP is a terrific language for certain list-intensive applications. But the problems of targeting machine cost and portability remain. Although considerable efforts have been made in the past five years to develop a standard, or "common," LISP implementation, different flavors still abound. Developers must choose among Franz LISP, Smalltalk, the public domain XLISP, Common LISP and others.

Girard sees a new role for LISP and similar languages. "I've also got my eye on products that translate LISP to C as you go along," he says. "These products might definitively change the direction of AI development. What LISP would become, at that point, is a fourth-generation language, an AI productivity tool." It is already possible to find LISP-to-C and Smalltalk-to-C translators, even in the public domain.

If performance is a factor, things look even worse for AI-

specific languages. Prolog gives programmers tremendous facility in defining inferential rules but at a considerable cost in program speed. LISP includes excellent automated memory management features that leave the programmer free to concentrate on the more critical design aspects of a program — again trading off performance for programming convenience. In the highly competitive AI software market, it is wise to use development tools that favor the user instead of the programmer.

Trickle down

Many of the ideas that make programming in LISP so pleasant have trickled down to programming environments that use traditional languages. The best examples are the C compilers for PCs from Borland International and Microsoft Corp.

Borland's Turbo C features compilation speeds that give it the feel of an interpreter. Programmers can change lines of code in the integrated editor, recompile the program on the fly and trace execution step by step. Microsoft's

C Compiler Version 5.0 provides a fully integrated environment. Programming with Microsoft C Compiler Version 5.0 is much like using a C machine — the C language equivalent of a Symbolics, Inc. LISP machine.

It is interesting, in this context, to recall that the concept of a windowing environment really came out of activities at Xerox Corp.'s Palo Alto Research Center in California in the mid-1970s. Out of that research effort came Smalltalk, an AI-oriented window-based program development environment.

Sometimes, an idea is all that can be usefully extracted from AI research, and it is doubtful that anyone would chastise Microsoft for failing to write OS/2 in LISP.

Many vendors are concentrating on making AI program development tools rather than finished applications. AI doesn't really fit into a specific application niche like word processing or data base management do. So we find the market full of programs such as First Class from Programs in Motion, Inc. in Cambridge, Mass., and Insight 2+ from Level Five Research, Inc. in Indialantic, Fla. These programs are expert system generators, and users are expected to fill in their own rules and knowledge bases. These programs were written in C.

As with any high-technology business, the bottom line in AI is functionality, not conceptual elegance. Insisting on LISP solely because it's an AI-specific language is an increasingly risky course to take. •

ESE doesn't do it: IBM's AI future remains shrouded

BY PAUL HESSINGER

IBM has, on numerous occasions, stated its strong commitment to artificial intelligence in general and expert systems specifically. For that reason, IBM's direction in AI must be monitored closely, even though its current offerings do not reflect any clear strategy.

IBM's mainframe tool, Expert System Environment (ESE), is not adequate for an aggressive implementation strategy. For example, it offers neither as much functionality nor as solid an architecture as the Aion Development System from Aion Corp. in Palo Alto, Calif.

In several areas — DB2, Systems Application Architecture, OS/2 support — Aion articulates a clearer direction for its product than IBM does.

Furthermore, ESE is a mainframe-only tool, and IBM has not clearly indicated the intention of providing a compatible Personal Computer-based tool.

Industrial strength

In all likelihood, within the next one to three years, IBM will deploy a new strategic expert system product that will address the development of an industrial-strength expert system by knowledge-engineering professionals within an MIS organization.

IBM recently announced Knowledgetool, which is intended for professional development technicians. This MVS/XA-based product will have tight integration with other strategic products, such as DB2. But Knowledgetool is probably not the long-term strategic product.

It is also unlikely that the final answer will emerge from IBM's joint venture with Intellicorp, Inc., although an MVS/XA version of Intellicorp's Knowledge Engineering Environment (KEE) will be a significant addition to the marketplace. In any case, users must be patient, because the migration of KEE to

the IBM mainframe environment will take some time.

In the meantime, there are other options open to IBM mainframe shops interested in AI. A number of expert system tool manufacturers have recognized the importance of IBM mainframe-based expert system technology and have made allowances for gateways from their native processor environments to IBM mainframes. In some instances, they are also making direct moves onto IBM's big machines.

This raises the important question of whether expert sys-

A NUMBER OF expert system tool manufacturers have recognized the importance of IBM mainframe-based expert system technology and have made allowances for gateways from their native processor environments to IBM mainframes.

tems will be the catalyst for the infiltration of non-IBM equipment at what are predominantly IBM sites.

Outside Big Blue

Digital Equipment Corp., for instance, clearly has extensive knowledge-engineering expertise. The company does not currently offer a discrete product and is not in a position to readily convert its experience with internal or custom systems integration efforts into a stand-alone commercial offering. But it could be an effective systems integration resource for expert systems-related endeavors.

Similarly, Apple Computer, Inc. represents an alternative workstation environment. Although Apple does not market an expert system project, Macintosh SEs and Macintosh IIs clearly represent powerful expert system delivery platforms.

Several expert system software tools are already available for the Macintosh. Many prominent vendors recognize the need to provide Macintosh support, in much the same way that DEC-based vendors realize that IBM environment support is a competitive necessity. •

Gross is chairman of Magnetic Press, Inc., a New York-based research firm specializing in emerging information and communications technologies.

Hessinger is vice-president of research and technology with Computer Task Group, Inc., a professional service and consulting firm in Buffalo, N.Y.

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A very significant trend is the combination of traditional data processing techniques with knowledge engineering techniques. Expert systems are now available that run on standard business machines, access corporate data bases and augment the capability of traditional business systems. These systems enable DP applications to incorporate rule processing in addition to traditional data processing.

As shown in Figure 1, key functions of business-oriented expert systems include the ability to access both a knowledge base and a corporate data base, while providing an intelligent interface to the user. Key features to look for include the following:

Knowledge Base: Expert systems provide access to a knowledge base containing facts, rules of inference, objects and models for a particular domain of expertise.

Knowledge Base Management System (KBMS): Access to the knowledge base is provided by the KBMS which includes a language for processing knowledge, a mechanism for searching and applying the facts and rules in the knowledge base (i.e., an inference engine), a control strategy for organizing the rule search and a means of explaining the sequence of rule firings that lead to a solution. The KBMS should be able to read and write information from the data base management system.

Data Base and DBMS: The corporate data base contains facts about the application (i.e., customer names, invoices, part numbers, etc.). An industry standard data base management system (e.g., IMS, DB2, IDMS/R, ADABAS, ORACLE, etc.) is typically used to access the corporate data.

Application Program: Business application programs should be able to utilize the DBMS to access the corporate data base and the KBMS to apply rules of inference to the facts in the data base. The use of an industry-standard language, such as SQL, facilitates access to both the data base and the knowledge base. The tool set should encourage the building of prototype applications (i.e., the specification of screens, reports, menus, transaction sequences, procedural logic, data base access, knowledge base access and inference processing).

Intelligent Human Interface: An important function of the expert system environment is to provide an intelligent interface to the end user. The human interface should operate in an intuitive manner, requiring little or no user training. Functions supported by the intelligent interface may include a natural language processor, speech interpreter, smart command editor, intelligent data base or text retrieval mechanism, and methodology guidance.

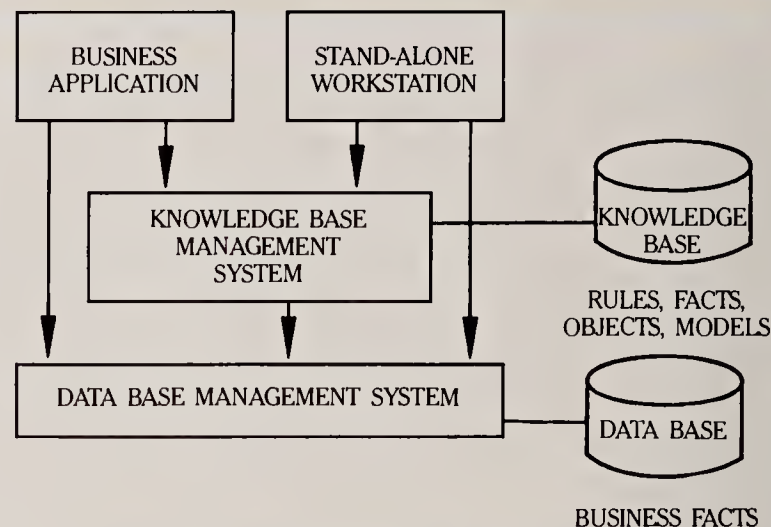


Figure 1. Integration of Business Application and Expert System Techniques

The functions of representative business-oriented expert system tools are described in Figure 1. Products which implement these and other key features will be discussed, contrasted and compared at the Symposium.

MAJOR BENEFITS OF AI/EXPERT SYSTEM TECHNOLOGY

The AI/expert system revolution will bring the following benefits to business organizations:

- **Mass replication of business knowledge and expertise.** Knowledge gained by experts through many years of experience can be made available selectively to other members of the organization.
- **Integration of knowledge base with corporate data base.** Business applications can gain access both to corporate data and to knowledge that defines how to make effective use of the data within the organization.
- **Extended decision-making capability.** The knowledge base of business procedures and accumulated experience may be used to augment and extend the decision-making capability of business managers.
- **Guidance in the use of complex procedures.** Expert systems may be used to train analysts in the use of new, complex procedures and tools. These systems may also be used in an "intelligent assistant" mode to guide experienced analysts in the application of a corporate-defined development methodology.
- **Improved human interfaces to computers.** A knowledge base of business-related experience may be utilized to simplify the human interface to the computer and to provide intelligent support for the business function being performed.

Atlanta, December 14-16, 1987 San Francisco, January 25-27, 1988

THE EXPERT SYSTEMS AND ARTIFICIAL INTELLIGENCE SYMPOSIUM FORMAT

DAY ONE of the Expert Systems and Artificial Intelligence Symposium provides a complete review of the technology: the major trends, characteristics, components and life cycle of the software; a review of vendor products and practical business applications; and a look ahead to future trends.

DAYS TWO AND THREE of the Symposium consist of one-hour product presentations from all of the leading developers of AI and Expert Systems products. Consultants from DCI will be available to direct you to the right presentations and answer your questions on AI/Expert Systems technology. Distinguished guest speakers, including Dr. George Schussel, Dr. Larry Harris, Herbert Schorr, Dr. Eric Firdman, and Gerald D. Cohen, will appear during the luncheon and afternoon to share their insights into where this technology is heading and what business applications are already available. Evening hospitalities will allow you to actually see and test the leading AI/Expert Systems products hands-on.

DAY ONE—SEMINAR LEADERS



JAMES MARTIN CHAIRMAN

James Martin has been described by *Computer Weekly* as the "computer industry's most widely read author and best attended lecturer." He has lectured to more than 20,000 DP professionals worldwide and has written nearly 50 best-selling books on computer/communications technology. Currently, Mr. Martin serves as chairman of James Martin Associates. His consulting work has included studies at the top management level for AT&T, IBM, Honeywell, Texas Instruments, GTE, DEC, ICL, Xerox, and numerous other firms in the computing and telecommunications industries.

Photography Courtesy of Deltak Training Corporation.



STEVEN W. OXMAN is the president of OXKO Corporation, a small hi-tech firm specializing in the Knowledge Engineering, Data Management, and Systems Integrations areas. Prior to founding OXKO, Mr. Oxman worked for the U.S. government in the computer science field. Assignments included Data Management research for NATO while working for the American Embassy in the Netherlands as well as helping the Dutch government introduce AI (Artificial Intelligence) and IT (Information Technology) on a national level. Mr. Oxman started his research in the AI arena in 1982 and has since been very active in the area of expert systems technology and the transfer of that technology to industry and government.

SEMINAR OUTLINE

1. Outline of Expert Systems and AI Technology

- What is expert system technology?
- Why is it vitally important for business applications?
- What business problems does it solve?
- How can rule processing be used in standard DP applications?

2. Examples of Business Applications of Expert Systems

- | | |
|-----------------------|---------------------|
| a. Trading systems | g. Scheduling |
| b. Authorization | h. Configuring |
| c. Financial analysis | i. Advice giving |
| d. Process control | j. Predictions |
| e. Planning | k. Explaining |
| f. Training | l. Knowledge fusing |

3. Categories of Expert Systems

- Packaging expertise for use by non-experts
- Improving the performance of technicians, business professionals, and management
- Systems which outperform top experts

4. Components of Expert Systems

- Knowledge base
- Inference processor and control mechanism

- Human interface
- Knowledge acquisition facility

5. Review of Vendor Products

- Expert systems for standard business environments
- Expert systems for IBM PCs
- Expert systems for standard minicomputers
- Expert systems for standard mainframes
- Expert systems for non-standard hardware
- Natural language processors
- Rule-based query systems
- Front-end products incorporating expert systems
- Speech input to machines

6. Expert System Environment

- PC workstations and tool sets
- Minicomputer tool sets
- Mainframe tool sets
- Special-purpose machines
- Integrated environment

7. Expert System Life Cycle

- System concept and analysis
- Specification of knowledge representation
- Specification of interface processor and control mechanism

- Knowledge acquisition
- Specification and development of human interface
- Initial prototype testing
- Evolution to production system

8. Benefits of Expert Systems for Business Applications

- Mass replication of scarce expertise
- Management of complexity
- Improved performance of technicians, business professionals and management
- Extended decision-making capability
- Automated design and programming
- Methodology guidance

9. Related Technologies

- | | |
|------------------------------|-----------------|
| a. CASE front ends | d. Speech input |
| b. Intelligent workstations | e. Linguistics |
| c. Development methodologies | f. Robotics |

10. Future Trends

- Integration of expert systems, 4GLs and CASE technology
- Inference processor add-ons to standard business machines
- High-performance parallel machines
- Continuous speech input systems
- Real-time operation of expert systems

D A Y S T W O

Aion Corporation

Aion Corporation of Palo Alto provides a complete line of inference-based programming tools for the design, development, delivery, and maintenance of MVS/TSO, MVS/CICS, IMS DB/DC, VM/CMS, and PC/DOS applications. Aion's ADS environment will be presented with special attention to issues of cross-system transportability, data access, life-cycle management, economic benefits of inference-processing in conventional application development, and opportunities for advanced expert-systems applications.

Artificial Intelligence Technologies, Inc.

The AIT LISP TOOLKIT was developed to provide an environment for building expert systems characterized by requirements for integration with existing systems, distribution over multiple processors, cooperating expert systems, and time critical response. The TOOLKIT runs under VMS and simplifies development and delivery of expert systems on the VAX.

Computer Sciences Corporation

Computer Sciences Corporation, Technology Activity: CSC's Design Generator is an Object-Oriented, expert system that automatically selects a central transform from a dataflow diagram and generates an initial design in structure chart notation. The graphic-intensive user interface features point'n'click, pop-ups and multi-pane browsers.

Digital Equipment Corporation

Digital Equipment Corporation, a leader in AI technology, products and services, presents its latest offerings for the expert system/AI developer and user. In addition to the VAX family of computers, Digital's AI offerings include VAX LISP V2.2, VAX OPS5, Neuron Data's NEXPERT OBJECT, Digital's AI Consulting and Educational Services, and Digital's Technology Transfer program.

EXSYS Inc.

EXSYS provides an environment for the rapid and easy development of powerful expert systems on MS-DOS, UNIX and VAX/VMS by non-AI professionals. Rules, an optional FRAME extension and easy interface to any other program for data acquisition or customization allows easy incorporation with existing systems and great flexibility. Automated tutorials get novice users creating systems in 1-2 days. High speed allows real-time systems to be developed.

Gold Hill Computers

Gold Hill Computers' 386 Hummingboard is an Intel 386-based board, running at 16 and 20 MHz,

designed to run large LISP applications faster. The board's directly addressable memory is expandable to 24 megabytes. GoldWorks is an expert system building tool for developing and delivering knowledge-based expert systems on personal computers. It combines a knowledge base, inference engine, and a multi-level open architecture.

IBM

Expert System Environment is an expert system shell with an extensive tool set for building and consulting knowledge bases. Although it provides a very rich set of features and functions, developers and end users can learn to create and use knowledge bases in a short period of time. Expert System Environment greatly enhances application development productivity because the application expert is directly involved. Expert System Environment directly supports interaction between the knowledge base and strategic data base, graphics and procedural subsystems.

Information Access Systems, Inc.

The Intelligent Text Management System (ITMS) has been installed as the base system for many Expert information management applications designed and implemented by IAS. Based on general and/or industry (or domain) specific knowledge representation models, the ITMS permits ordinary language queries of large document bases. Installed ITMS systems have significantly increased the productivity associated with the classification, retrieval and distribution of both unstructured textual material and formatted field data.

Information Builders, Inc.

Information Builders, Inc., the developer of the FOCUS fourth generation language, has recently acquired Level Five Research, one of the leaders in practical expert systems implementation. Currently IBI is offering two expert system tools, PC LEVEL5 and VAX LEVEL5. The tools are particularly useful in applications that require a high degree of integration with installed software and existing customer databases.

IntelliCorp

IntelliCorp is the industry's leading provider of high-end knowledge systems development software. IntelliCorp will present: the Knowledge Engineering Environment (KEE) system, the most widely-used software for developing large-scale applications; the new KEEconnection software, for integrating KEE applications and SQL databases; and, SimKit, a KEE-based modeling and simulation product.

Presenter

Aion Corporation

Artificial Intelligence Corporation

Artificial Intelligence Technologies, Inc.

Computer Sciences Corporation

Digital Equipment Corporation

EXSYS Inc.

Gold Hill Computers

IBM

Information Access Systems, Inc.

Information Builders, Inc.

IntelliCorp

KnowledgeWare, Inc.

LogicWare

mdb's, Inc.

Neuron Data

Programs in Motion Inc.

Texas Instruments

Transform Logic

UMECORP

Unisys Corporation

Xerox

A N D T H R E E

Product

AION DEVELOPMENT SYSTEM
INTELLECT
AIT LISP TOOLKIT
DESIGN GENERATOR
DIGITAL'S RANGE OF AI PRODUCTS & SERVICES
EXSYS EXPERT SYSTEM DEVELOPMENT SOFTWARE
GOLDWORKS/HUMMINGBOARD
IBM EXPERT SYSTEM ENVIRONMENT
ITMS
ITDS
J-SPACE
LEVEL5
KNOWLEDGE ENGINEERING ENVIRONMENT (KEE) SYSTEM
SIMKIT
KEE CONNECTION
INFORMATION ENGINEERING WORKBENCH GAMMA
TWAICE
GURU
NEXPERT OBJECT
1st-CLASS
1st-CLASS FUSION
EXPERT SYSTEM DEVELOPMENT USING PERSONAL CONSULTANT
ADVANCED AI APPLICATIONS USING THE EXPLORER FAMILY
TRANSFORM
EXPERT CONTROLLER
XPS-85
UNISYS R & D EXPERT SYSTEMS
XEROX ARTIFICIAL INTELLIGENCE PRODUCTS

KnowledgeWare, Inc.

KnowledgeWare, Inc. provides software tools to automate MIS/DP. The Information Engineering Workbench/Workstation uses CASE techniques automating creation, validation, and maintenance of decomposition, entity-relationship, data-flow, and action diagrams. The expert system module validates process and data models against hundreds of structured logic rules, decipheres diagram meaning, and stores this in the knowledge-base immediately reflecting changes in any diagram.

LogicWare

Logicware provides expert system development tools tailored for mainstream, corporate MIS and DP environments. LogicWare will be demonstrating TWAICE, a powerful, portable, and integrated expert system shell and knowledge engineering environment. TWAICE is available on IBM mainframes under VM/CMS and MVS/TSO, DEC VAX, M6800 workstations and IBM PC/AT and PS/2 under PC-DOS and OS/2.

mdbs, Inc.

mdbs, Inc., an internationally-recognized producer of software development tools, will present GURU. GURU is an expert system environment for application developers. It blends rule-based expert system technology with traditional information management processes. GURU is available on single user PCs, local area networks, and the entire range of VAX computers.

Neuron Data

Nexpert is an object oriented expert system shell developed by Neuron Data, Inc. Nexpert supports variable rules and a combination of forward and backward chaining. It includes capabilities of both frame representation, which has multiple inheritance, and of pattern matching rules. The system can automatically generate graphical representation of network of rules. It offers direct access to relational databases and it's delivered as a sharable image.

Programs in Motion Inc.

President William Hapgood developed the product 1st-CLASS which has made the company an industry leader in expert system tools. 1st-CLASS FUSION was introduced in July of 1987. Programs in Motion Inc., having sold over 1,000 copies of 1st-CLASS continues to expand both their domestic and foreign markets. They have achieved their goal to develop the best expert system shell that offers ease of use, reasonable cost and powerful features all in one.

Texas Instruments

Personal Consultant is the industry's leading expert system development tool for PC-based AI applications. The series includes Personal Consultant Easy, and Personal Consultant Plus. The Explorer family of high-performance symbolic processing computers includes the recently announced Explorer II, the industry's current price/performance leader. The systems are used primarily for development and delivery of knowledge-based applications.

Transform Logic

Transform Logic's TRANSFORM product family automates COBOL application software design, development and maintenance in IBM mainframe environments. Transform Logic will present the concepts behind development automation and application base management using TRANSFORM. Data driven design architecture, environment independence, and design prototyping are features of this approach.

UMECORP

The Expert Controller from UMECORP is a dedicated programmable high-speed expert system computer consisting of a host-independent asynchronous processing microcomputer using low-power CMOS technology and proprietary software. Included are communication drivers for interfacing the Expert Controller to machinery in real-time operating environments. Also, UMECORP is presenting XPS-85, a language for knowledge-based factory automation.

Unisys Corporation

In order to support acquisition and maintenance of large real-world knowledge bases for expert systems, Unisys has developed KNET, a data structure for recording semantic relations. KNET forms the nucleus of the Unisys R&D projects, KSTAMP and Beacon. KSTAMP is an expert system designed for diagnosing problems in complex electrochemical equipment. BEACON is an expert system designed for use in configuring large computer systems.

XEROX

XEROX products for expert systems development and delivery include the Xerox Artificial Intelligence Environment (XAIE) integrated with the Xerox 1186 and Xerox 1185 Artificial Intelligence Workstations. The Xerox 1186 is a powerful Lisp machine that delivers superior cost/performance for AI application development. The Xerox 1186 brings superior Lisp performance at low cost to users for application delivery.

Guest Speakers



DR. GEORGE SCHUSSEL is one of the world's foremost experts in data base management technologies. He is president and founder of Digital Consulting, Inc. a prominent high technology education and management consulting firm that specializes in software productivity tools and is recognized as the world leader in DBMS and 4GLs. Dr. Schussel is also Chairman of the National Database and 4th/5th Generation Language (DB & 4/5GL) Symposia. His influential role in the industry prompted *ICP Interface* to name him the "Guru of Data Base Management."

5th Generation Technologies: Where's the Beef?

Topics:

- The Need for Productivity Demands New Approaches
- The Fifth Generation
- Computer Aided Software Engineering (CASE)
- The Future of Data Management Software
- Programmer Workstations
- The End of Canned Applications
- Artificial Intelligence—the Limitations
- The New Technologies Will Affect How You Organize Your Department and Company



DR. HERBERT SCHORR, group Director of Advanced Systems, Information Storage and Systems Group with IBM, heads the Artificial Intelligence and Image Champions for IBM and is responsible for products, marketing, and internal applications of these new technologies. Dr. Schorr received his Ph.D. in Electric Engineering from Princeton and has served on the faculty at Columbia University. Dr. Schorr is a member of the Institute of Electrical and Electronics Engineers and the Association for Computing Machinery.

Knowledge-Based Systems: Recent Applications and Future Directions

Topics:

- How knowledge-based systems improve business productivity
- Successful integration with traditional data systems—the biggest payback
- Recent customer and internal applications
- New directions will provide the necessary products and support for users



DR. LARRY R. HARRIS is founder and Chairman of the Board of Artificial Intelligence Corporation. Dr. Harris is an internationally recognized authority on all aspects of AI technology, especially with regard to natural language and expert systems. He received his PhD in Computer Science from Cornell University specializing in AI and has authored the INTELLECT natural language information system. Dr. Harris is also the author of the book, *Artificial Intelligence Enters the Marketplace*.

Expert Systems Technology in the Marketplace

Topics:

- The Evolution of Expert Systems Technology in the Corporate Environment
- Expert Systems Tools Requirements
- The Four AI Paradigms in an Expert System

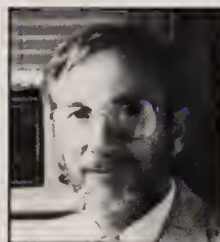


DR. HENRY ERIC FIRDMAN is one of the leading independent practitioners and consultants on Artificial Intelligence subjects. Prior to emigrating to the USA, he was director of the largest AI research laboratory in the Soviet Union. In the six years he has been in the USA, Dr. Firdman has worked on the development of expert systems and knowledge based systems for Arthur D. Little, Access Technology, Inc., Software Collaborative, Ltd. and Hewlett-Packard. He has authored nearly 100 publications and has lectured to many audiences on AI topics.

Expert System Development in the Workplace

Topics:

- Expert Systems Applications in the Workplace
- The Five Major Pitfalls of Expert Systems Application and How to Avoid Them
- Actual Case Histories



GERALD D. COHEN is the President and founder of Information Builders, Inc. He is a leader in the area of software portability and has engineered FOCUS for operation on IBM mainframes, DEC, WANG, and UNIX computers, plus an IBM/PC version. Mr. Cohen was previously a Vice President of Mathematica, where he developed the original RAMIS system. He pioneered non-procedural computer languages and created the first 4th generation language. He holds a Master's Degree in Operations Research from Columbia University and a Bachelor of Mechanical Engineering from CCNY.

The Merging of Database and Expert Systems

Topics:

- The Integration of Database and Expert Systems Technology
- Expert System Applications

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- AI and expert system technology may be used in combination with traditional data processing techniques to solve business problems.
- What standard business data processing environments are supported by leading AI/expert system products.
- What types of business problems are especially appropriate for solution by expert systems and artificial intelligence.
- What components and functionality you should look for in AI/expert system products.
- How to categorize, evaluate and compare AI/expert system products.
- How to integrate AI/expert system technology within your current DP organization.
- WHO THE KEY PLAYERS ARE IN AI/EXPERT SYSTEM TECHNOLOGY.

PROCEEDINGS

Each Symposium attendee will receive a copy of our "Expert Systems and Artificial Intelligence Symposium" Proceedings. This resource document will serve as a useful reference long after the Symposium is over.

HOSPITALITY SUITES

These suites provide a relaxed environment in which you can ask questions and socialize with industry leaders. Enjoy the product demos and the chance to relax and share the company of fellow attendees.

AI/EXPERT SYSTEM TECHNOLOGY REVOLUTIONIZES AND IMPROVES BUSINESS SYSTEMS BY:

- Packaging expertise for use by non-experts (i.e., financial planning, investments, hobbies, etc.).
- Improving the performance of technician systems (i.e., credit card authorization, scheduling systems, oil drilling advisory systems, equipment diagnostic systems, etc.).
- Providing aid to top experts (i.e., knowledge engineering systems for seismic analysis, medical diagnostics, financial analysis, oil prospecting, etc.).
- Providing access to both a data base of facts and a knowledge base containing rules on how to utilize the facts.
- Adding rule processing to traditional DP applications.
- Improving the capability of decision support systems through the use of expert system techniques.
- Incorporating methodology guidance within front end tools in order to provide intelligent assistance to experienced analysts.
- Providing a new training environment for complex tools that uses expert system rules to lead the trainee step-by-step in the most effective way to learn new techniques.
- Building expert system capability into computer-aided software engineering (CASE) tools.

WHO SHOULD ATTEND

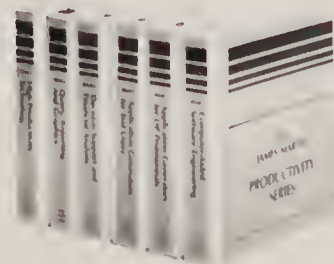
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- 7—Expert Systems and AI Toolkits
- 8—PC Tools
- 9—Relational Database Management Systems (*early '88*)
- 10—Network Management Tools (*early '88*)



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These seminars will be conducted by Digital Consulting, Inc. (DCI), a leader in the field of EDP management training. DCI is headquartered at 5 Kimberly Terrace, Lynnfield, MA 01940, telephone (617) 470-3870.

CANCELLATION POLICY

Cancellations received two weeks or more prior to the Symposium will be accepted subject to a cancellation service charge of \$100. Transfers to a different Symposium date or substitutions will be accepted with no cancellation service charge as long as the fee is paid and the request is received before the date of the original Symposium. Registrants whose cancellation requests are not received two weeks prior to the Symposium (or no shows) are liable for the entire fee.

To receive a current catalog of DCI sponsored seminars and conferences, call (617) 470-3880.

MEETING SITES AND HOTEL ACCOMMODATIONS



Atlanta Marriott Marquis December 14-16, 1987

Located in the heart of Atlanta's Peachtree Center, the city's prestigious office and shopping complex, the Atlanta Marriott Marquis features 1,674 beautifully appointed guest rooms, a soaring 47-story atrium, Atlanta's only indoor-outdoor pool, and a full service health club. For dining and relaxation, the hotel boasts 5 elegant restaurants and lounges. The hotel is within minutes of many of Atlanta's sites and is connected by Rapid Rail (MARTA) to a host of other attractions. The hotel is located at 265 Peachtree Center Avenue, Atlanta, GA 30303, (404) 586-6145.



Hyatt Regency San Francisco January 25-27, 1988

Located in downtown San Francisco, the Hyatt Regency Embarcadero Center is a landmark in luxury, service and cuisine. The Hyatt Regency boasts four distinctive restaurants and lounges: Mrs. Candy's for casual dining, The Other Trellis for cocktails, The Market Place for intimate California cuisine, and the incomparable Equinox for leisurely cocktails and dining with a revolving view of the city. Embarcadero Center is a wonderful place to shop and dine among fountains, bay views and internationally famed artworks. The hotel is located at 5 Embarcadero Center, San Francisco, California 94111, (415) 788-1234.

REGISTRATION FORM

The Expert Systems and Artificial Intelligence Symposium

- ☐ 1068. Atlanta, December 14-16, 1987
☐ 1080. San Francisco, January 25-27, 1988

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INTERVIEW

WATCH THE RABBITS

Ed Mahler is program manager for artificial intelligence at Du Pont Co. in Wilmington, Del. Trained in chemical engineering, he has a long and varied history with the company, having spent five years in research, five years in manufacturing and five years in corporate-level strategic planning. While in the strategic planning group, Mahler created a new position for himself as liaison for emerging technology. In this post, it was his responsibility to evaluate new technologies in terms of their potential as either commercial products or internal productivity aids. After analyzing AI in this way, Mahler decided that it was a technology that Du Pont should pursue and created the program he now manages with the support of a six-person staff and 20 individuals in various departments who report to him.

Du Pont's AI effort, as overseen by Mahler, is highly decentralized and built around the principles that expert systems should be written by users and should run on existing equipment. Since its formal start in April 1986, Mahler's program has assisted in the creation of more than 100 expert systems now in regular use. Five hundred more are currently in various stages of development. Mahler spoke recently with *Computerworld* Senior Editor Joanne Kelleher.

How does what you are doing at Du Pont differ from AI efforts at other companies?

We are the only company, as far as I know, that has done it as an orchestrated grass roots effort. Many companies, including those with centralized programs, have also had grass roots efforts going on in AI. The difference is that they aren't coordinating and managing them.

I also think that the process is technology-driven in most places, so they have a solution looking for a problem. When that's the case, they figure that they'd better hunt with the biggest guns they can carry.

And you don't believe in big guns?

Well, you know a lot of people say that Du Pont is just shooting rabbits by going after smaller and more approachable problems. They say we'd get a lot more meat if we hunted elephants. But we don't believe in creating a safari to go and look for elephants.

Our strategy is to have people shoot rabbits. Anything that moves, pretend it is a rabbit and shoot it. One of two things happens: It's a rabbit, and you get meat for supper, or it's an elephant, and you shot it in the knee. Now, you may have aggravated the elephant by shooting it in the knee, but at least you found it.

Have you ever had occasion to hire a development team to bring down an el-

ephant-size problem?

Yes, we've hired some hunters, and we've had some bad experiences. One of two things happened. Either they found a rabbit and butchered the poor thing with their elephant guns, or they said, "Gee, we can't find any elephants. It's going to take a lot longer and cost a lot more money for us to find some."

Our experience has been that the dividends are much better with a coordinated grass roots program that tackles smaller problems.

Speaking of dividends, I've seen reports that expert systems will save Du Pont \$10 million this year and that you have achieved a 1,500% return on software and labor costs. Are those figures correct?

That's right. But that is nothing compared with next year. We were just getting started this year. We built all the structures like the users group and the site coordinator support and training structures. Now we are ready.

What about the failure rate?

At Du Pont, we hit about 90%; that is, nine out of every 10 projects we start are finished and turn commercial.

Did you have any initial reservations about AI?

At first I thought that it had great promise, but the tool structure didn't align well with our corporate knowledge distri-

bution or our resource bases. We did not have a big contingent of LISP programmers, so if that was going to be the application methodology, we were either going to have to rent them or grow them from scratch.

But then I saw some applications-oriented stuff that was in classical languages — kind of Lotus-type spreadsheet stuff — that showed real promise, given that we had highly dispersed knowledge and that the people who had the knowledge tended to be Lotus-literate people.

You have said that businesses ought to have a business plan for AI. Can you describe the evolution of the business plan at Du Pont?

What I'm talking about is not a business plan in the classic sense. It is understanding the opportunity, understanding the technology and looking at the resource options. It is also putting those three things together in a way that makes sense for you.

For Du Pont, in AI, the natural fit was to have a dispersed technology, because the knowledge was highly dispersed. To put that in perspective, the company has 1,700 products, and some of the products individually have 10,000 subtypes. We have more than 120 plants scattered worldwide, with three or four products per plant, two or three processing steps per product and 50 to 200 unit operations per step.

How were projects picked in the beginning?

Back when we didn't have anything, I went to guys in my old-boy network who knew me personally and who would take a risk on my word. I picked friends who were in different functions and different environments. So I consciously thought about testing the boundaries of the opportunity. That experimental phase of the program was not geared to picking out guaranteed successes; it was meant to establish the boundaries of the playing field.

How do you define the function of your AI task force?

Let me change the word "func-

tion" to "mission." Our mission is to catalyze the implementation of AI, particularly knowledge-based systems, broadly and effectively throughout Du Pont.

Are the task force members experts in AI?

No. There were no formally trained experts going into this, although a couple had dabbled in it on their own. When we began our first experimental work in the fall of 1985, I intentionally rounded up folks with various



Ed Mahler

ALAN WITSCHONKE

backgrounds. Some of the degrees and backgrounds in the group when it was originally formed were electrical engineering and process control, marketing research, computer science, classical systems support, a hard-line computer research, agricultural chemistry and a physics major who spent most of his time in photochemistry.

We wanted a bunch of old-boy networks that didn't overlap that much, so we would have a broad influence base. Also, we wanted to be able to evaluate the technology from lots of different viewpoints.

What is your relationship to MIS?

I'm in the information systems department, and I report to their vice-president. But we have been active in end-user computing, so it hasn't really been a strong central relationship.

Do you and your group actually create any expert systems?

No. We made it a fundamental principle that we would not build expert systems centrally. We

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will help people build them and teach them how to build others or maintain ones they have, but we will not build any.

Why do you think a build-your-own approach is preferable to having specially trained personnel create expert systems on specialized machines and software?

One reason is that it is a dynamic program and maintenance is a never-ending event, and you need to be close to the changing needs. Another is that doing it this way fosters ownership by the people who have to use it.

What do these user-created expert systems run on?

What ours run on is existing hardware. If the existing hardware is an IBM mainframe, that is what they run on. If it's a Digital Equipment Corp. VAX, that's what they run on. That is a critical point — the idea that you don't have to create a new hardware environment to use AI but can use what you've already got.

But are there problems for which that approach is not workable? Don't you have a number of LISP machines at Du Pont?

In research, but I would say that we are evaluating the tools more than the problems. I don't know that it was so much that we needed to go to LISP machines as it was that we were on an exploration mission, trying to see if they would address problems that our other equipment would not — problems like trying to design new instruments in object-oriented space to speed up the development cycle. And the results are still out. No systems are close to running in those environments; they are years away.

Can these subject experts analyze their own thought processes well enough to create systems that other people can use?

Usually. Occasionally we have an MIS person in the business unit support staff act as a "knowledge engineer." For the most part, though, people don't have any trouble doing it themselves, because the tools supply the structures and tend to be pretty useful in terms of supplying a reasonable structure.

What kind of training do users get before they start to build an expert system?

For builders, it takes two days. During that time, we teach them what an expert system is, elementary knowledge engineering and the mechanics of two to three tools.

Does what you are doing prove that most knowledge engineers aren't necessary?

Let me just say that the classical

definition of knowledge engineer — a person who has both strong interview skills and deep programming skills — does not fit very well in the Du Pont culture.

We took coding out of the equation. We said, "We're not going to code expert systems; we're going to have fill-in-the-blanks." Most people know how to structure the knowledge, and if the tool supplies the structure,

no interview process is necessary. You just ask the person to regurgitate what he knows.

How much have expert system shells improved in the time you've been working with them?

There's a big difference. When they first started out, they were terrible. They're still not perfect, but they're better. There is

kind of a base set of functionality you need if a tool is going to be really useful. What you need is image capture and display, automatic data base access and power behind the screens. And they have come a long way in being able to give you that capability.

Are there any features you'd like to see that current shells don't offer?

I have the functional spec for what I call the Lotus 1-2-3 of expert systems. It would have all of the things I just mentioned, plus it would supply the two most common paradigms — diagnosis and therapy and structured selection problems. It would also use type-over menus. That's how people build things. You take one that works, and you change the names. •

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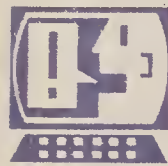
How to make an intelligent decision about an artificial intelligence language.



VENDOR VIEWPOINT

Demystifying applications

BY WALTER REITMAN



In their enthusiasm for expert systems, people tend to lump various products together, often ignoring the significant differences between tools and application packages. Each has a distinct and important role, and it is time to spell these roles out.

Like expert system tools, application packages take advantage of artificial intel-

ligence technology. Unlike tools, however, packages require no programming by users, and they provide users with state-of-the-art, functional expertise right out of the box.

Sometimes a company's expertise is specific to its own processes, products and business methods; some of it may be proprietary. In the absence of a commercial product, there is no alternative to

building your own expert system. For such applications, expert system tools offer tremendous advantages. Tool-based expert systems can offer AI's benefits at a fraction of the cost of comparable systems built from scratch.

There are, however, broad problem areas common to many businesses. Companies buy generic data base systems and accounting packages from outside vendors. Why not generic expert systems?

Valuing new business opportunities is one example of an application for which a generic expert system makes a great deal of sense. Different companies may evaluate their opportunities differently, but all use a common base of expertise: the generally accepted analytic concepts of finance and accounting.

Planning for effective management of manufacturing capacity is another task easily handled by a generic expert system. Every company has its own products and methods of organizing work flows. But most companies share a basic set of common capacity planning concerns.

In cases like those above, the right expert system application package offers an attractive and economical alternative to building a system from scratch.

Economic advantage

Because the commercial system developer amortizes knowledge-engineering costs across many purchasers, dollars spent on a commercial expert system application can buy substantially more functional breadth and depth. Thus, the commercial expert system developer can afford to work with a range of specialists. More and better choices translate into better decisions and better solutions.

The commercial developer, having only one broad class of business problems in mind, can afford to base and optimize a product on a combination of AI methods ideally suited to a particular business area's requirements.

In contrast, expert system tools are

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UNLIKE expert system tools, application packages provide users with state-of-the-art, functional expertise right out of the box.

much more general in their intended range of uses. Consequently, applications built with them are unlikely to match a commercial application product's performance. The commercial application's higher performance translates into greater user productivity. Because users can consider more alternatives in the same amount of time, they are likely to end up with better decisions.

The coming compromise

As expert system technology and our skill in applying it continue to improve, more alternatives will become available. As the number of expert system tools in the market continues to grow, and as tools become commodity products, tool companies are being driven to add value to their products by targeting specialized versions for individual business markets.

Developers of commercial expert system application packages are working to increase flexibility and generality in their products. We should soon begin to see the first targeted expert system shells coming on the market. Like application packages, they will include substantial amounts of expertise for a targeted business area. Like tools, they will allow the in-house technical staff to build their own expert systems.

Tools, application packages and shells are all subsets of the category of expert systems. They are complementary alternatives, each with its own important place. This increasing product differentiation may be confusing, but it is part of the maturation of the expert system market. Don't lump everything together. There's more to expert systems than just tools. •

Reitman is senior vice-president of technology at Palladian Software, Inc. in Cambridge, Mass.

Expert system shells

COMPANY	PRODUCT	HARDWARE	LANGUAGE USED	KNOWLEDGE REPRESENTATION	TYPE OF CONTROL STRUCTURES	INCLUDES CERTAINTY FACTORS	INCLUDES EDITING TOOLS	INCLUDES TRACE AND DEBUG FACILITIES	INCLUDES EXPLANATION FACILITY	EXPLAINS CONCLUSION REACHED	EXPLAINS INFORMATION REQUESTS	SAVES DATA FOR TESTING	SOFTWARE INTERFACES	VARIETIES OF INTERFACE	TYPE(S) OF USER INTERFACE	INCLUDES SEPARATE RUNTIME MODULE	PRICE
Aion Corp. (415) 328-9595	Aion Development System	Any IBM with 370 architecture under VM and MVS, IBM PC, PS/2	Pascal, some C, assembler	Rule-based, object-definition structures	Forward and backward chaining, procedural control logic optional	Yes	Yes	Yes	Yes	Yes	Yes	Yes	VSAM, QSAM, DL/1, DB2, SQL/DS, Dbase III, Rbase 5000	Call, be called	Menu, graphic, text, external optional	Yes	Information not provided
	Aion Execution System	Any IBM with 370 architecture under VM and MVS, IBM PC, PS/2	Pascal, some C, assembler	Rule-based, object-definition structures	Forward and backward chaining, procedural control logic optional	Yes	Yes	Yes	Yes	Yes	Yes	Yes	VSAM, QSAM, DL/1, DB2, SQL/DS, Dbase III, Rbase 5000	Call, be called	Menu, graphic, text, external optional	Yes	Information not provided
Arity Corp. (800) PC-ARITY	Arity/Expert	IBM PC and compatibles	Prolog	Frame-based	Backward chaining	Yes	No	Yes	Yes	Yes	Yes	Optional	1-2-3, Dbase III, ASCII files or link to C	—	Any	Optional	\$295
Automated Reasoning Corp. (212) 206-6331	Micro Intelligent Automatic Testing Equipment	Macintosh 512K, Mac SE, Mac Plus	C	Rule-based	Procedural control logic	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Any file that can be called from LISP	Call, read, write	Menu	Yes	\$5,000-\$10,000
California Intelligence (415) 391-4846	Xsys	IBM PC and compatibles	LISP	—	—	—	Yes	—	Yes	—	—	—	—	—	—	—	\$995
Carnegie Group, Inc. (412) 642-6900	Knowledge Craft	Sun, Microvax, VAX 8000, TI, Symbolics	Common LISP	Frame-based semantic network, frames, logic representation, production systems	Forward and backward chaining, object-oriented, agendas, demons, event hierarchies	Yes	Yes	Yes	Optional	Yes	Yes	No	Call-out from LISP, Record Management System on VAX	Read, write, call, be called	Window, icon, graphic, menu, natural language	Yes	\$9,500-\$72,500
Computer Thought Corp. (214) 424-3511	OPS5+ with C interface	IBM PC and compatibles, Sun workstation, Macintosh, Apollo workstation, HP 9000, Tektronix 4400	C	Rule-based	Forward chaining	No	Yes	Yes	No	No	No	Yes	Any file that can be called from C	Call	Mouse menu, graphic	Optional	\$1,800 (PC version)
Computer Software Management & Information Center (COSMIC) (404) 542-3265	Aesop	VAX	Franz LISP	Logic-based	Forward chaining	Yes	No	—	No	Yes	Yes	Yes	NA	Interactive	Natural language	No	\$300
	Cerberus	VAX/VMS	Fortran 77	Logical rule-based with associated levels of confidence	Forward chaining	Yes	No	Yes	—	Yes	No	No	NA	Interactive	User answers assertions with "Yes," "No" or percent certainty	Yes	\$1,750
	Star	Unix or VAX	C	Network	Forward chaining	No	No	Yes	Yes	No	No	No	Any data structure defined in C	Interactive	Natural language	No	\$2,000
	Clips	IBM PC	C	Pattern matching	Forward chaining	Yes	Yes	Yes	—	Yes	No	Yes	May be embedded into any other program	Interactive	Command-driven, mouse windows	Yes	\$200
Cullinet Software, Inc. (617) 329-7700	Application Expert	IBM 4300 through 3090, Microvax through VAX 8975	Cobol	Rule-based	Forward and backward chaining	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Dectalk voice response, Cobol-based applications	Call, be called	Menu, question, smart form, window, voice response	No	\$14,000-\$60,000
Dynacomp, Inc. (716) 265-4040	Hansen-Predict	Any IBM	Machine language	Rule-based	Forward chaining	No	Yes	Yes	Yes	No	Yes	Yes	None	—	Menu	Yes	\$99.95
Dynamic Master Systems, Inc. (404) 565-0771	Topsi	IBM PC and compatibles	C	Rule-based	Forward chaining	No	Ltd	Yes	No	Yes	No	Yes	Any file that can be called from C	Call, read, write	None	No	\$250
Expertech (702) 831-0136	XI Plus	IBM PC, XT, AT and compatibles	V 1.5 Prolog V 2C	Rule-, fact-, question, query-based, demon, default	Forward and backward chaining, demons	No	Yes	Yes	Yes	Yes	Yes	Yes	PC Paintbrush, Window Paint, 1-2-3, Supercalc 4, Dbase, Dr. Halo II, PC Paint Plus, ASCII files, others	Read, write, call, be called	Menu, graphic, natural language, forms facility	Yes	\$1,250
Expertelligence, Inc. (805) 969-7871	Expercommon OPS5	Macintosh II, Mac Plus, Mac SE	Common LISP	Rule-based	Forward chaining	No	Yes	Yes	No	No	No	—	NA	Call, Macintosh metaphor	Menu, mouse	No	\$625
	Experfacts	Macintosh 512K, Mac SE and Mac Plus	Experlisp 1.5	Rule-based	Forward and backward chaining	No	Yes	No	Yes	Yes	Yes	—	NA	Call, Macintosh metaphor	Menu, mouse	No	\$495
	ExperOPS5 Plus	Macintosh 512K, Mac SE, Mac Plus	Experlisp 1.5	Rule-based	Forward chaining	No	Yes	Yes	No	No	No	—	NA	Call, Macintosh metaphor	Menu, mouse	No	\$495

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. Further product information is available from the vendors.

COMPANY	PRODUCT	HARDWARE	LANGUAGE USED	KNOWLEDGE REPRESENTATION	TYPE OF CONTROL STRUCTURES	INCLUDES CERTAINTY FACTORS	INCLUDES EDITING TOOLS	INCLUDES TRACE AND DEBUG FACILITIES	INCLUDES EXPLANATION FACILITY	EXPLAINS CONCLUSION REACHED	EXPLAINS INFORMATION REQUESTS	SAVES DATA FOR TESTING	SOFTWARE INTERFACES	VARIETIES OF INTERFACE	TYPE(S) OF USER INTERFACE	INCLUDES SEPARATE RUNTIME MODULE	PRICE
Expert Systems International (215) 735-8510	ESP Advisor	IBM PC, XT, AT and compatibles, any VAX	Prolog	Rule-based	Backward chaining	No	Yes	Yes	Yes	Yes	Yes	Yes	—	Call, be called	Prolog 2	Yes	\$895
	ESP Frame-Engine	IBM PC, XT, AT and compatibles	Prolog	Rule-, frame-based	Forward and backward chaining	No	Yes	Yes	Yes	Yes	Yes	Yes	—	Call, be called	Prolog 2	Yes	\$895
Exsys, Inc. (505) 836-6676	Expert System Development Package	IBM PC, XT, AT and compatibles, VAX and compatibles, some Unix	C	Rule-based	Forward and backward chaining	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Any running under host operating system	Call, be called	Menu	Yes	From \$395
Gensym Corp. (617) 547-9606	G2	VAX, Explorer, Symbolics 3600, Sun 3	Common LISP	Rule-based	Forward and backward chaining, model based	Fuzzy logic	Yes	Yes	Yes	Yes	NA	Yes	NA	Read, write, call, be called	Menu, graphic, natural language, forms facility	No	\$36,000
Gold Hill Computers, Inc. (617) 492-2071	Goldworks	IBM PC AT and compatibles	GC LISP	Frame-based, multiple inheritance lattice, multiple values for slots	Forward and backward chaining, goal-directed forward chaining	Yes	Yes	Yes	Yes	Yes	Yes	—	1-2-3, Dbase III, C, assembler	—	Menu, graphic	Yes	\$7,500
Honeywell Bull, Inc. (617) 895-6000	Idothea	IBM PC AT, Symbolics	Common LISP	Logic-, frame-, rule-based	Forward, backward and mixed chaining, truth maintenance, knowledge base dependency, direct backtracking	No	Yes	No	Yes	Yes	Yes	No	C programs	Read, write, call, be called	Menu, graphic	No	Information not provided
Inference Corp. (213) 417-7997	Automated Reasoning Tool	Symbolics, Explorer, Sun, Microvax	LISP	Rule-based	Forward and backward chaining	Yes	Yes	Yes	Yes	Yes	Yes	Yes	None	Interactive, call, be called	Graphic	Yes	\$29,500-\$60,000
Information Builders, Inc. (212) 736-4433	Level 5	IBM PC and compatibles, VAX	Proprietary language	Rule-based	Backward chaining	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Dbase II and III, Datatrieve, RS/1	Read, write	PF key driven	Yes	\$456-\$685
Intellipcorp (415) 965-5500	Knowledge Engineering Environment	LISP machines, Symbolics, TI, Xerox, Apollo, Sun, VAX workstations; IBM PC RT	LISP	Frame-, rule-based, object-oriented programming, assumption-based truth maintenance	Forward and backward chaining, agenda controllers, multiple worlds, active values	No	Yes	Yes	Yes	Yes	No	—	SQL-based relational data bases; any C program through KEE/C Integration Tool Kit	—	Menu, natural language, object-oriented graphic, other	Yes	\$55,000
Intelligenceware, Inc. (213) 417-8896	Intelligence/Compiler	IBM PC, AT	C	Frame-, logic-, rule-based	Forward and backward chaining, exact and semiexact inference	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Dbase, Lotus, any file that can be called from C	Call, be called	Menu	No	\$490
	Experteach-II	IBM PC, AT	Intelligence/Compiler	Rule-based, compiler	Forward and backward chaining	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Dbase, Lotus, any file that can be called from C	ASCII files, call, be called	Menu	No	\$475
	Auto-Intelligence	IBM PC, AT	Intelligence/Compiler	Inductive, example-based	Forward and backward chaining	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Dbase, Lotus, any file that can be called from C	Call	Menu	No	\$490
	IXL, The Machine Learning System	IBM PC, AT	Intelligence/Compiler	Rule-, frame-based	Backward chaining	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Dbase, Lotus, any file than can be called from C	Call	Menu	No	\$490
Jeffrey Perrone & Associates, Inc. (415) 431-9562	Expert-Ease	IBM PC and compatibles except PC AT	Pascal	Example-based	Inductive inference	No	Yes	Yes	Yes	Yes	Optional	Yes	None	NA	Menu, graphic	Yes	\$695
	Expert Edge	IBM PC AT and compatibles	Pascal	Rule-based	Forward and backward chaining	Yes	Yes	Ltd	Yes	Yes	Yes	Yes	1-2-3, Visicalc, Dbase III, any ASCII file	Read, write	Menu	Yes	\$1,495
KDS Corp. (312) 251-2621	KDS 3+	IBM PC AT, XT, PS/2 with 512K-byte minimum, requires 80287 or 80387 chip	Assembler	Object-oriented, example-based	Forward and backward chaining	Yes	Yes	Yes	Yes	Yes	No	Yes	1-2-3, Dbase III	Call or direct interface	Menu, graphic optional	Yes	\$1,495
Lightwave, Inc. (813) 988-5033	Expert System Inference Engine	IBM PC and compatibles	Pascal	IF-THEN	Deductive backward chaining	No	Yes	Yes	Yes	Yes	No	No	None	NA	Menu, graphics, natural language	Yes	\$144
Machine Intelligence Corp. (516) 589-1676	Wizdom	Unix System V environment	—	Fact-based	Forward and backward chaining	Yes	Yes	—	Yes	Yes	—	—	—	—	Menu, graphic	—	From \$85
	Mice	MS-DOS environment	C	Fact-based	Forward and backward chaining	Yes	Yes	—	Yes	Yes	—	—	—	—	Menu, graphic	—	From \$85
MDBS, Inc. (317) 463-2581	Guru	IBM PC and compatibles, IBM RT PC, any VAX, Novell and 3Com on LAN	Lattice C	Rule-based	Forward and backward chaining	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Knowledgegem/2, MDBS III, Dbase III, 1-2-3	Read, write, call, be called	Menu, natural language, command language	Yes	From \$6,500
Miller Microcomputer Services (617) 653-6136	Expert-2	IBM PC, PS/2 and compatibles; Tandy TRS 80 Models 1, 3, 4, 4P, 4D	MMS Forth	Rule-based, consequent reasoning	Consequent reasoning	Optional	Yes	Yes	Yes	Yes	Yes	No	MMS Forth Forthwrite, Datahandler, Datahandler Plus	NA	Menu, graphics, natural language	No	From \$250 (including MMS Forth)

COMPANY	PRODUCT	HARDWARE	LANGUAGE USED	KNOWLEDGE REPRESENTATION	TYPE OF CONTROL STRUCTURES	INCLUDES CERTAINTY FACTORS	INCLUDES EDITING TOOLS	INCLUDES TRACE AND DEBUG FACILITIES	INCLUDES EXPLANATION FACILITY	EXPLAINS CONCLUSION REACHED	EXPLAINS INFORMATION REQUESTS	SAVES DATA FOR TESTING	SOFTWARE INTERFACES	VARIETIES OF INTERFACE	TYPE(S) OF USER INTERFACE	INCLUDES SEPARATE RUNTIME MODULE	PRICE
Mountain View Press, Inc. (415) 961-4103	MVP-Forth Expert 2	Apple, IBM PC and compatibles, Amiga, any CP/M system	Forth	Rule-based	Forward chaining	No	Yes	No	Yes	Yes	Yes	Yes	None	—	Menu	Yes	\$150
Neuron Data, Inc. (415) 321-4488	Nexpert Object	IBM PC AT, PS/2 and 386 compatibles; Macintosh; VAX 2000 Models 2, 3; all Unix workstations	C	Rule-, object-based	Forward and backward chaining	No	Yes	Yes	Yes	Yes	Yes	Yes	Excel, RDB, Oracle, Dbase III, 1-2-3, others	Call, be called	Menu, graphics	Yes	\$5,000-\$10,000
Nixdorf Computer AG (617) 890-3600	Twaice	Unix machines, VAX/VMS, MVS, DOS/VSE (Unix, Xenix, OS/2 on PC)	Prolog	Rule-based	Forward and backward chaining	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Unix file system, Lotus, IDMS, any relational DBMS	Read, write, call	Menu	Yes	\$35,000
Paperback Software International (415) 644-2116	VP-Expert	IBM PC	Proprietary	Rule-based	Backward chaining	Yes	Yes	Yes	Yes	Yes	Yes	—	Lotus, Dbase, any ASCII file	Read, write	Menu	Yes	\$124.95
PAR Technology Corp. (315) 738-0600	ERS	VAX, IBM PC, CM/P	C	Inference networks	Goal-driven backward chaining	Yes	Yes	Yes	Yes	Yes	Yes	No	General-purpose for C and Unix	Call, be called	Menu	No	\$2,000
Personal Computer Engineers, Inc. (213) 757-7537	Knowledge-Oriented Programming System (KOPS)/Dbase	IBM PC and compatibles	Coded in Dbase	Rule-based	Pattern matching	Yes	Yes	—	Yes	Yes	Yes	Yes	Dbase III, any ASCII file	—	Menu	No	\$75
	KOPS/FW2	IBM PC and compatibles	Proprietary	Rule-based	Pattern matching	Yes	Yes	—	Yes	Yes	Yes	Yes	Dbase III, any ASCII file	—	Menu	No	\$100
Prediction Systems, Inc. (201) 223-5000	General Simulation System	Any VAX/VMS	Proprietary	—	—	—	Yes	Yes	—	No	No	Optional	None	Call, read, write	Menu, graphics, natural language	No	From \$19,000
Production Systems Technologies, Inc. (412) 683-4000	OPS83	Apollo, AT&T 3B, HP 9000 Series 300, IBM PC and compatibles, Masscomp, Stratus, Sun, any VAX	C	Rule-based	Any	Optional	No	Yes	Optional	No	No	Yes	Any file that can be called from C	Call	Natural language	Yes	\$1,950-\$20,000
Programming Logic Systems, Inc. (203) 877-7988	Augmented Prolog for expert systems	IBM PC and compatibles	Micro Prolog	Rule-based	—	—	Yes	—	Yes	—	—	—	—	—	Menu	—	From \$99
Programs in Motion (617) 358-7722	First Class, First Class Fusion	IBM PC, AT, PS/2 and compatibles	Pascal, some assembler	Inductive, example-based; rule entry optional	Inductive example	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Lotus, Dbase, any ASCII file	Read, write	Menu, graphics	Yes	\$495-\$1,295
Radian Corp. (512) 454-4797	Rulemaster 2	IBM PC, XT, AT, 3000; Cyber 860, 990, 205; VAX; HP 9000; Apollo and Sun workstations; Masscomp; Unisys XE/550	C	Rule-, example-based	Forward and backward chaining	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Any file than can be called from C any ASCII file	Read, write, call, be called	Menu, window	Yes	\$495-\$28,000
Smart Communications, Inc. (212) 486-1894	Smart Expert Editor	Any VAX; Sun, Unix workstations	C	Rule-based	Forward and backward chaining	Yes	Yes	No	Yes	Yes	Yes	Yes	All word processing packages, any ASCII file	Preset interface to user	Menu	Yes	\$4,500-\$12,500
	Smart Translator	Any VAX; Sun, Unix workstations	C	Rule-based	Forward and backward chaining	Yes	Yes	No	Yes	Yes	Yes	Yes	All word processing packages, any ASCII file	Preset interface to user	Menu	Yes	\$38,500-\$85,000
Softsync, Inc. (212) 685-2080	Superexpert	IBM PC, AT, XT and compatibles, Macintosh	Forth, Pascal	Example-based	Forward and backward chaining	No	Yes	Yes	Yes	Yes	No	NA	Any ASCII file	Preset interface	Natural language, menu	Yes	\$199.95
Software AE, Inc. (703) 527-4344	Knowledge Engineering System	IBM mainframes, PC and compatibles; Apollo; HP and Silicon Graphics workstations; any VAX under VMS and Unix; Gould Pownodes; any Unisys; CDC Cyber	C	Object-oriented, rule-based; production rules subsystem, hypothesis and test subsystem, bayes subsystem	Forward and backward chaining	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Any file that can be called from C	Read, write, call	Menu-driven text queries, graphics optional	Yes	\$4,000-\$60,000

COMPANY	PRODUCT	HARDWARE	LANGUAGE USED	KNOWLEDGE REPRESENTATION	TYPE OF CONTROL STRUCTURES	INCLUDES CERTAINTY FACTORS	INCLUDES EDITING TOOLS	INCLUDES TRACE AND DEBUG FACILITIES	INCLUDES EXPLANATION FACILITY	EXPLAINS CONCLUSION REACHED	EXPLAINS INFORMATION REQUESTS	SAVES DATA FOR TESTING	SOFTWARE INTERFACES	VARIETIES OF INTERFACE	TYPE(S) OF USER INTERFACE	INCLUDES SEPARATE RUNTIME MODULE	PRICE
Systems Research Laboratories, Inc. (513) 426-6000	Dexpert	Any mini or IBM PC compatible	LISP	Production systems	Backward chaining	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Any with Fortran or ADA environment	Read, write, call, be called	Menu	Yes	\$3,500
Teknowledge, Inc. (415) 424-9955	Copernicus	Microvax, VAX, Sun, Apollo, IBM AT, 3300, 4300, 3080, 3090	C	Logic-, fact-, rule-, frame-based, production systems	Forward and backward chaining, procedural control blocks	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Any file than can be called from C, Cobol, graphic and data base	Read, write, call, be called	Menus, graphics	Yes	\$12,000-\$45,000
	S.1	Sun, Apollo, Microvax, VAX, AT&T 7300, IBM PC AT, RT PC, 3000 HP 9000	C	Rule-, fact-, frame-based, production systems	Forward and backward chaining, procedural control blocks	Yes	Yes	Yes	Yes	Yes	Yes	Yes	C, graphic and data base package	Read, write, call, be called	Menus, graphics	Yes	\$9,000-\$25,000
	M.1	IBM PC, XT, AT, Vectra, Compaq and compatibles	C	Logic-, rule-, fact, relation-based, production systems	Forward and backward chaining	Yes	Yes	Yes	Yes	Yes	Yes	Yes	C, assembler, graphics, data base package	Read, write, call, be called	Menus, graphics	Yes	\$5,000
Texas Instruments, Inc. (800) 527-3500	Personal Consultant series	Any IBM PC; TI PC, Business Pro, Explorer; Deskpro 386; delivery to VAX CPU	LISP, C	Frame-, rule-based	Forward and backward chaining	Yes	Yes	Yes	Yes	Yes	Yes	Yes	1-2-3, Dbase II and III, other DDS programs and packages supporting CSV	Read, write, call, be called	Menu, graphics	Yes	\$495-\$2,950
Unisys Corp. (313) 972-7000	KES II	IBM PC, AT, IT; Unisys 5000, 7000 series, Unix	C	Product rule-, frame-based, classes and inheritance, demons	Forward and backward chaining, minimal set covering, Bayesian reasoning	Yes	No	Yes	Yes	Yes	Yes	Yes	1-2-3	Read, write, call	Text, automatically generated menus	Yes	\$2,000-\$29,000
	KEE/PC-to-Host	Explorer	LISP	Frame-based, production systems	Forward and backward chaining	No	Yes	Yes	Yes	Yes	Yes	Yes	LISP, KS/Answer	Read, write, call, be called	Menus, graphics	Yes	\$49,500

VENDOR VIEWPOINT

Machine learning: The next step

BY KAMRAN PARSAYE



Most professionals possess two commodities in excess — data they cannot understand and processing power they cannot use.

A tremendous amount of valuable knowledge is already locked in data bases that no one has the time to explore, and with the expansion of disk storage capacity, this situation will be exacerbated. At the same time, much of professional workstations and multiuser systems' processing power remains underutilized.

Thanks to artificial intelligence technology, however, processing capacity currently being wasted can be used to transform raw data into a useful form. AI permits the creation of software programs independent enough to analyze a data base without supervision. When equipped with this software, workstations can be left on every night to analyze data and discover useful information.

Programs that learn from examples and data are called ma-

chine learning programs. The term "machine learning" generally refers to a program's ability to discover or "learn" information by itself. When applied to large data bases, machine learning offers a natural bridge between AI and data base management.

Machine learning should not, however, be confused with query processing. When using a query language, if we ask a relevant question, we will get an interesting answer. Often, though, there is so much data that it camouflages the relevant questions.

Unexpected relationships

In a machine learning system, the program discovers relevant questions by performing an intelligent data analysis. Often, this analysis points out unexpected relationships that may be pursued. Thus, machine learning may be viewed as a layer on top of the data base query system.

Traditionally, given a large amount of data, statistical techniques have been used to gain insight into the trends that exist in the data base. Decades ago, statistical techniques emerged as methods of analyzing numeric data. These techniques can be

useful in providing insight into the overall data structure.

However, while statistical techniques are useful, they should not be viewed as the only tools for data analysis. Because these techniques require human interpretation, only a small portion of the knowledge hidden in a data base can be explored.

Furthermore, statistical techniques almost always focus on numeric, not symbolic, information, producing equations and matrices instead of logical relationships such as rules. These current statistical techniques alone will not capture explicit knowledge from the data.

To capture knowledge, we need to use machine learning techniques to discover "logical relationships," which are expressed in terms of rules rather than equations. Rules are much more readable than mathematical equations; as a result, the output from a machine learning system is usually easy to comprehend. Machine learning programs that analyze data and uncover its structure combine the traditional wisdom of statistics with the advanced technology of AI to achieve new levels of functionality in knowledge discovery.

To make data analysis widely available, we need to do the following:

- Extend statistics and combine them with AI to discover logical relationships and knowledge — a machine learning system.
- Use AI to achieve a new level of data interpretation — expert statistician systems.

Based on advances in expert system technology and machine learning, such a goal is completely feasible and has been implemented in a number of systems. Examples include the RX system at Stanford University, which analyzes ARAMIS, the data base of the American Rheumatology Association, and AT&T Bell Laboratories' Rex, a front end to a regression analysis system.

Corporate concerns

Administrative and organizational questions may be raised concerning the applications of machine learning in a corporate environment. For example, who administers such a system on a mainframe? The answer is, the same person who administers the data base. Users may, however, download data from the mainframe and perform analysis on their workstations to avoid using mainframe CPU cycles.

What about data security considerations? The data in the data base should, of course, offer its own measures of security. But experience has shown that motivated users can gain insight into a data base's structure with repeated statistical queries. The

result of these repeated queries may then be used to infer information considered "secure."

By providing better analysis than statistics, machine learning systems may provide better insight to such motivated users, especially since the analysis can be performed off-line on a personal computer.

There is every indication that the corporate world will embrace machine learning. One of the main goals of many executives is to optimize the distillation of useful information from raw data. Statistical techniques can provide curves that help in gaining such insight. But more insight can be obtained with a machine learning system that produces easy-to-comprehend logical relationships.

Furthermore, the cost/benefit ratio for machine learning systems is attractive. A machine learning system has to discover only a few unexpected relationships to pay for itself.

Machine learning systems are easy to use, since they require minimal programming. While encoding knowledge in an expert system takes time and effort, a machine learning system can often simply be added on top of the data base.

The payoffs from machine learning are likely to be significant. Even if we manage to provide a fraction of data base users with hidden knowledge from their data bases, we will increase productivity substantially within society as a whole. •

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Users stretch VM to the limit

Customers find gaps in the system and original ways to plug them

BY TREVOR EDDOLLS

The VM marketed by IBM is not a single control program but six separate entities aimed at different markets. The markets overlap to some degree, but they represent different target users.

VM/IS Base and VM/IS are designed and marketed for users of intermediate and low-end environments. VM/SP and VM/SP System Offering are both aimed at intermediate environments and offer all the facilities associated with VM. VM/SP HPO is aimed at performance-oriented large environments, and, lastly, VM/XA SP is targeted at large environments, particularly those that need to run MVS/XA.

Given such a variety of selling points, why do users choose VM?

A survey conducted by Xephon Technology Transfer Ltd. in Newbury, UK, in December 1986 looked at VM in practice and found the following statistics to be true:

- 35% of VM sites selected VM to allow multiple guest operating systems.
- 19% chose VM for its personal computing facilities, such as CMS and APL.
- 10% wanted VM for developing and testing software.
- 8% chose VM for conversion work.

Eddolls is the editor of *VM Update*, a monthly technical journal published by Xephon Technology Transfer Ltd. in Newbury, UK. Xephon's U.S. representative can be reached at P.O. Box 4480, Winter Park, Fla. 32793.

- Another 8% chose VM to relieve storage constraints.

This range of reasons illustrates the flexibility built into VM. Part of the system's flexibility lies in the extent to which systems programming staff can tailor their particular version of VM on-site, regardless of the environment targeted by that version.

This is particularly true of the VM systems aimed at intermediate to large users.

Clever expansion

I am constantly surprised both by the gaps in VM that users discover and by the originality and variety of the solutions adopted to fill them.

Conversational Monitor System, better known as CMS, is an interactive operating system that provides a fairly sophisticated editor called XEdit. Many users tell of how they expand these facilities.

For example, Peter Cornelius, a senior systems programmer in Swansea, UK, and Steve Lovett, a technical support manager in Taylors, S.C., both say they found that XEdit lacked an equivalent to the K command of ICCF on VSE systems.

They wrote the Restructured Extended Executor (Rexx) language programs to allow users to copy lines from various files and insert those lines into a different file. The user simply types "K" or "KK" next to the line or block

of text to be copied.

Tony Bakic, a systems programmer at Broome County Computer Services in Binghamton, N.Y., found it was inconvenient to make the same change to a number of different files. He recalls having to change a PROC name in every production JCL file.

Bakic's solution was to write a Rexx program to do this for him. The program expects three items as input:

- The file type of files to be changed.
- The old string to be changed.
- The new string to be added.

From this input, the program creates a master file containing the names of all the files to be modified.

The master file is then read, and each file listed in it is edited to make the appropriate change. As it edits each file, the program sends a message to the user's

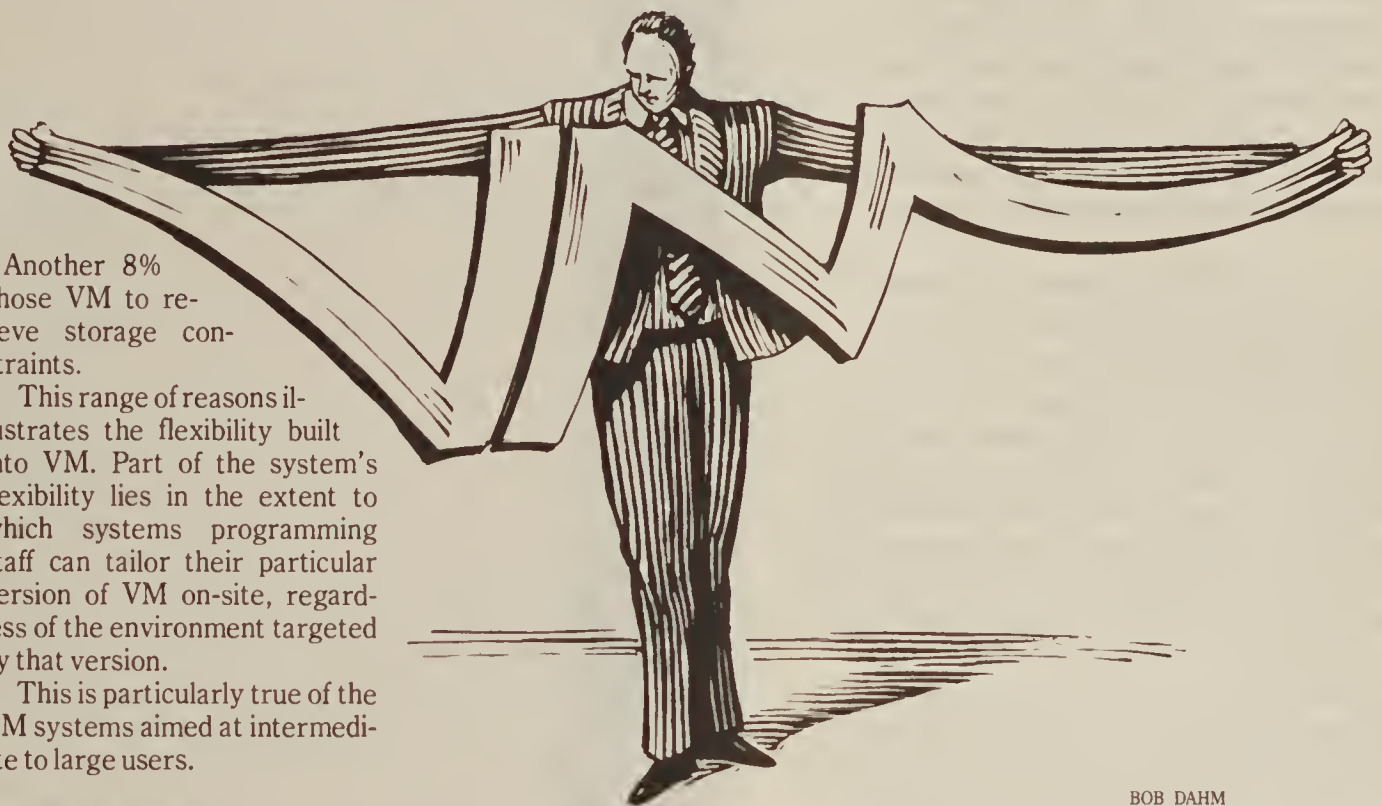
terminal indicating how many changes have been made to that file.

Needed to scan

Per Stavfor of Per Data AB in Vasterhaninge, Sweden, wrote a Rexx program that allowed XEdit macros to be included in an EXEC that was triggered from a CMS command line. Stavfor's approach also afforded a method of scanning for particular strings of text in several CMS files.

Nathan Trivette, a technical services administrator with Ingersoll-Rand Co. in Mocksville, N.C., also noticed the need for a scan EXEC. The EXEC Trivette wrote scans CMS files for a specified literal and creates a separate CMS file containing all the "hits."

J. P. Richardson, project leader with National Advanced Systems in Isleworth, Middlesex,



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UK, thought it would be useful when reediting a file to be able to start at the place at which he had stopped editing on the previous occasion.

To this end, Richardson wrote four Rexx programs that together effectively gave XEdit a memory.

When a user ends an XEdit session, the facility remembers the line that was being edited and the cursor position on that line. The facility also remembers any horizontal shift the file had

several virtual machines, keeping track of the correct job to use and where it was last saved can be complex.

Guido van Leuven, a systems programmer with N.V. Texaco Belgium SA in Wetteren, Belgium, suggested a method of controlling code changes using standard VM facilities.

Van Leuven suggested grouping all the data under one

user ID, called FILEMNGR, which has read and write access to a number of minidisks. Only one person at a time can work on a production file, which then replaces the original when it is saved. A history file records the changes.

A related problem was experienced by Gary Jenkins, a systems programmer with the University of Kentucky Medical

Center in Lexington. He experienced problems when programmers accidentally updated the production copy of a file without a backup copy on which to fall back.

To avoid the problem, Jenkins wrote a Rexx program that is invoked anytime someone wishes to make an update on a production file.

The program renames the

production copy of the file and places the user in XEdit on this copy. The program allows up to 10 generations of backups for each production file.

Change own password
Security with VM is, at best, fairly simplistic. Access to the system requires that the user enter a user ID and a password. These are stored with other

VM/CMS WAS designed from the outset to be a system that allows multiple interactive users. Yet native SNA support was introduced only recently.

on the screen.

The user must remove entries from the saved information file if the file being XEdited is erased or if so many days have passed that the user cannot remember what was being done.

A full spool

The spool area in VM is used to contain print files, reader files and punch files. VM sends warning messages to the operator when spool space reaches 90% full and again when it is completely full.

But if the operator misses the 90% message, it may be too late to save files when the "100% full" message is displayed. The system will need to be re-IPLed (initial program load), and the restart may cause a loss of some spool files.

W. H. Sau, a computer project officer with Cathay Pacific Airways in Hong Kong, produced an assembler program that calculates and displays the current spool utilization. The Diagnose command retrieves this information at any time and displays it in terms of how many 4K-byte pages are being used.

An enhancement to this program was suggested by Robert Ko, a senior systems programmer with Inchcape Management Services Ltd. in Hong Kong.

Ko took matters one step further by making the spool space information available from a CP CMS command, giving operators access to the information from the console without a CMS log-on.

Hard to keep track of

At many sites, EXECs, files, JCL, source programs and so on are placed in common storage and are available to several users.

With many systems programmers maintaining a system and each programmer controlling

It's one thing to fill a document with data, another to fill it with content that makes someone take action. The document that best persuades not only has a typeset appearance, with visual as well as typographic elements, but also has superior content—facts and figures drawn from all possible sources to make a point of view, a point of sale.

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information in the system directory.

VM uses these passwords to restrict access to data stored on the minidisks by assigning users read or write access. The Multiwrite password allows more than one user to write to the data.

Senior systems programmer Cornelius suggested a method for users who do not have the

DIRMAINT program to change their own passwords. His system maintains a record of the last six passwords used and the date and time the last password change was made. He also included the code to allow an authorized user to make inquiries about another user's password.

There were two problems that Jeffry Lee, a senior systems programmer from Markham,

Ont., Canada, identified.

The first was a problem with restoring a CMS user's minidisk after it was saved to tape. After restoration all the A0 files were missing.

The second problem occurred when one user linked to another user's minidisk with read-only access and could not find the required files because they were in A0 mode.

Lee suggested a modification to the access module itself to make A0 files available. It should be noted that a file mode number of 0 is supposed to restrict access to the creator of that file only.

Newcomer to SNA

VM/CMS was designed from the outset to be a system that allowed multiple interactive users.

Yet native IBM Systems Network Architecture (SNA) support was introduced only recently, with the arrival of VM/XA SP Release 2.

Until then, network communication under VM consisted of RSCS for RJE devices. Pass-through with its IBM 3274 emulation facility allows VM, MVS and VSE machines to be connected in a BSC network. Users wishing to switch between two CICSs can use the inappropriately named Dial command.

SNA was available only under

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vary from page to page and must incorporate extensive changes right up to the last minute. (Isn't that just about every job?) Even the most sophisticated PC-based desktop publishing systems lack this critical ability to handle instant change.

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...not baskets.



VM IS CLEARLY a strategic system in the eyes of IBM, and one can expect improvements and enhancements to VM at regular intervals in the future.

a guest system with VTAM Communications Network Application running under VM. VM Release 4 offered a VTAM implementation under the control of GCS, a system many people consider to be little more than a cut-down version of MVS.

Alfred Schaal, a systems programmer with RAFI GmbH in Ravensburg, West Germany, found CICS users experienced a problem when they had to re-dial into CICS after being dropped from VM. The users would be assigned a new CICS terminal ID (term-ID).

Schaal's solution was to modify DMKDIA so it converts the virtual line address to the real line address on the Dial user ID command. This modification ensures that the user always gets the same CICS term-ID.

Paul Sapsford, a systems programmer from Broxbourne, Hertfordshire, UK, experienced

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ISDN is fast approaching. Some say with too little agreement on fundamental standards and applications. Attend this highly focused, intensive session to anticipate the emerging standards, vendor trials, conflicts, successes, products and service offerings that will emerge over the next several years.

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Dr. Wushow Chou, Professor of Computer Science and Electrical and Computer Engineering, North Carolina State University



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Atul Kapoor, Vice President, Kaptronix Inc.



This tutorial gives you a thorough and comprehensive introduction to IBM's NetView and NetView/PC — their operation, technical specs, dependencies and functional interactions, plus an analysis of their impact on the industry, significance for users, and practical suggestions for implementation.

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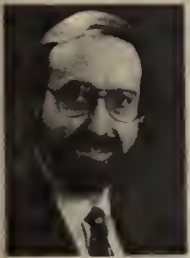
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Take this comprehensive seminar to make sense of the increasingly complex regulatory environment. You will receive a thorough briefing on the legal, social, and regulatory issues, the evolution of vendor technology and industry standards, and significant developments affecting the coming regulatory year. **Level:** Intermediate.

T-13 INTRODUCTION TO DATA COMMUNICATIONS

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This perennially popular tutorial provides exactly the right mix of concept, technology, and application for the beginner to get a good foundation in data communications. The course notes are excellent reference material and the instructor is one of the most highly regarded professionals in the industry. **Level:** Introductory.

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James Morgan, Principal, J.H. Morgan Consultants



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Robert L. Ellis, President, The Aries Group



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problems with three remote lines that support 50 terminals.

Sapsford wrote a new CP command for the VM nucleus that allowed an authorized user — typically the operator — to automatically redial those remote screens into CICS.

This simplified life for both operators and users.

VTAM to VTAM

Kevin Kelly, a senior systems programmer with Pfizer, Inc. in Portland, Ore., describes how at his site they connect ACF/V-TAM running in their VSE guest systems with VM/VTAM.

The process involves loading

ONE OF THE big problems with converting from VSE to MVS is the effort it takes to make the new system work as well as the old one did. Users are unimpressed if the service they receive from the new system is worse than it was under the old one.

the correct Network Control Program (NCP) into the 3725 communications controller. Operators must also take a copy of the VM NCP file and copy it to VSE to ensure that all major VTAM nodes are known to both systems.

This complicated procedure is necessary to connect the two

VTAM systems.

Many sites run one or more guest operating systems under VM. Arie Tikva of Bahia, Brazil, found that CMS users interrogating a guest MVS system — typically to find out the status of their batch jobs running under JES — cost too much in terms of system overhead.

His solution was to implement a disconnected virtual machine that issues, at installation-defined intervals, the JES commands \$DA and \$DN using the JES/RSCS networking facility.

The information returned is formatted and written to a mini-disk, which can be browsed through by other CMS users without affecting MVS performance or overhead.

A matter of convenience

Keith Burton, a lead systems programmer at the University of Kentucky Medical Center, submitted a JES2 user exit that sends the output from jobs run under JES2 back to the VM user ID that originally submitted the job. He does this without using RSCS.

Roger Call, a systems programmer with Huff Cook Mutual Burial Association in Bristol, Va., found it was inconvenient to move the printer back and forth from VSE to VM. As with most sites, the majority of his print load came from the VSE guest system, and just a few utility reports came from the VM print queue.

Call's program facilitates a transfer of print jobs from the VM reader queue to the VSE Power queue. Normally, users edit programs in XEdit during development and then submit them to VSE for compiling. The system routes the listing back to

the user through the Router machine. Once the listing is in the user's reader queue, it can be examined, purged or returned to VSE for printing.

Runs like it used to

Many shops use VM while converting from VSE to MVS.

One of the big problems associated with this conversion is the amount of effort it takes to make the new system work as well as the old one did. Users tend to be unimpressed by the fact that the DP department has been working very hard for long hours if the service they receive from the new system is worse than it was under the old one.

One task involves converting all of the VSE JCL to MVS JCL. A Rexx program that was contributed by Andy Jezierski, a systems programmer with HBO & Co. in Evanston, Ill., does just that.

Apart from some difficulties with the disposition parameter, the program — which runs under CMS — converts the JCL automatically. It leaves the programmer to perform the minimum amount of work: He simply checks that the new MVS values are correct.

The VM system is clearly a strategic system in the eyes of IBM, and one can expect improvements and enhancements to the system to occur at regular intervals in the foreseeable future.

However, users will always be able to identify areas that could be improved or gaps in facilities available and will continue to develop ways to overcome the problems. It is the exchange of this type of information that makes VM such a flexible system. •



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TAKING CHARGE

Anthony Reed

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Most performance reviews reflect one individual's viewpoint. However, that person's actions and decisions, such as setting unrealistic deadlines and demanding excessive overtime, can adversely affect employees in ways that are hidden from upper management.

This is especially true of data processing project leaders and managers. A project may be completed on time, which from the perspective of upper management is good, but may leave many "dead bodies" behind. When managers, peers and subordinates have different opinions of a person's performance, the department can become a ticking time bomb.

If a company values its workers, it needs to include them in the process of evaluating its policies, ethics and management. Employees feel attached to the products they produce and want to become a part of the decision-making process that affects the quality of those products.

An annual employee attitude survey and follow-up can greatly improve worker morale. However, conducting the survey without adequate follow-up can hurt workers' morale by giving them a false sense of hope, which leads to depression. It's like being stood up for a date.

For instance

Let's look at two examples. At one company, a manager was highly thought of by the boss

Continued on page 66

Shopping for synergy, Sears creates CIO post

BY DAVID A. LUDLUM
CW STAFF

CHICAGO — Sears, Roebuck and Co. has created the post of chief information officer, which will be held by former corporate planning chief, currently the No. 2 executive at the Dean Witter Financial Services, Inc. subsidiary.

Charles F. Moran, who started working for Sears after college in 1954 as a management trainee and rose through store management and the chain's merchandising operations, will assume the new post at the beginning of next year, Sears said in a recent announcement.

Moran, 57, who will also hold the title of senior vice-president, will sit on the company's corporate management committee and report to Chairman and

Chief Executive Officer Edward A. Brennan.

His responsibilities will include Sears Communication Network, a corporate function, and information systems for the four business groups — Merchandising, Dean Witter, Allstate Insurance Co. and Coldwell Banker Real Estate Group, according to corporate spokesman Douglas A. Fairweather.

Moran declined to comment on his appointment, saying that would be premature.

Fairweather said he expects creation of the post to enhance efforts begun with the formation of Sears Communication Network several years ago to generate synergies, find overlaps and establish backup among the Sears business units. "I think what this says is that whatever

Continued on page 66

Orchestral maneuvers

Boston banker conducts strategic systems efforts

BY DAVID A. LUDLUM
CW STAFF

BOSTON — In his placid office in the headquarters of the 203-year-old Bank of Boston Corp., with his conservative red tie set off by a crisp white shirt, John H. Rogers looks the part of the genteel New England banker.

But Rogers, who joined the region's largest banking company last year after a stint as a Cleveland-based consultant, is not a candidate for such simple classification.

He shows a breezy, cheery disposition, speaks in a pensive, sometimes detached manner and is described by one former associate as an easygoing manager.

At Bank of Boston, Rogers is "an orchestrator, an architect, a strategic planner," who is skilled in personal communication and comfortable with senior management, says William Synnott, who was Rogers' predecessor as the company's top systems executive and worked with him during a seven-month transition.

No prima donna

But Synnott also says Rogers can be hard-nosed about decisions, and others call him forceful — even relentless. "I would say that John has some very ambitious goals and objectives and has successfully convinced a range of people to meet those goals and objectives," says Jack Martin, director of Bank of Boston's retail systems organization. He describes Rogers as having a strong personality, with gifts for influence and persuasion — chiefly "intelligent reasoning."

And a former colleague at Ameritrust Corp. in Cleveland, where Rogers was the top executive for human resources and

PROFILE

John H. Rogers



Position: Director of corporate information and technology, Bank of Boston Corp.

Mission: Coordinating corporate and divisional information systems technology, personnel and budgets.

then operations, says Rogers is intently focused on goals.

Rogers recruits well, drives his employees hard and gets results, says Peter Osenar, executive vice-president for retail administration at Ameritrust. Those attributes have made him the top mentor at Ameritrust, leading more of his subordinates to top management positions than anyone else, Osenar says.

Osenar says he found that Rogers' focus made him exciting to work for, but he observes that others have not always shared that view. "People who are less clearly focused or who have different agendas obviously see that as a problem," he says. "There's no doubt about it; he challenges you."

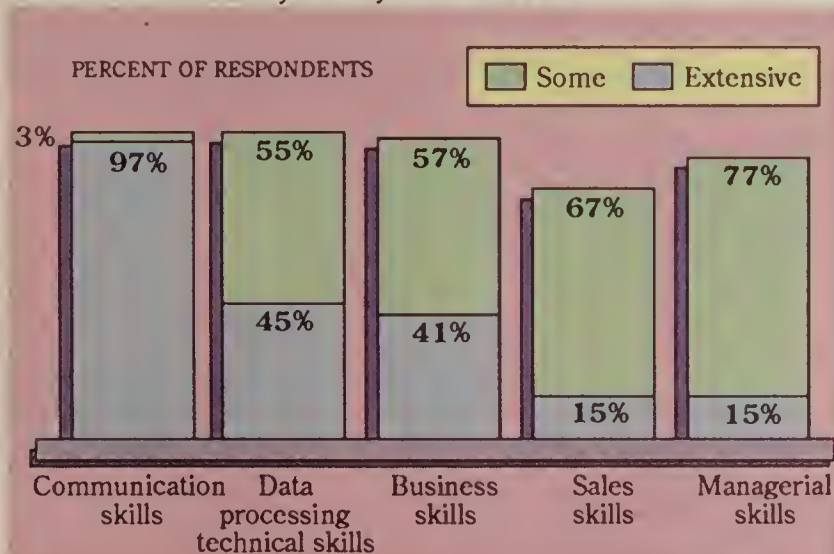
Rogers, 49, brings a general banking background to Bank of Boston's top systems post. He studied political science at Yale

Continued on page 64

Data View

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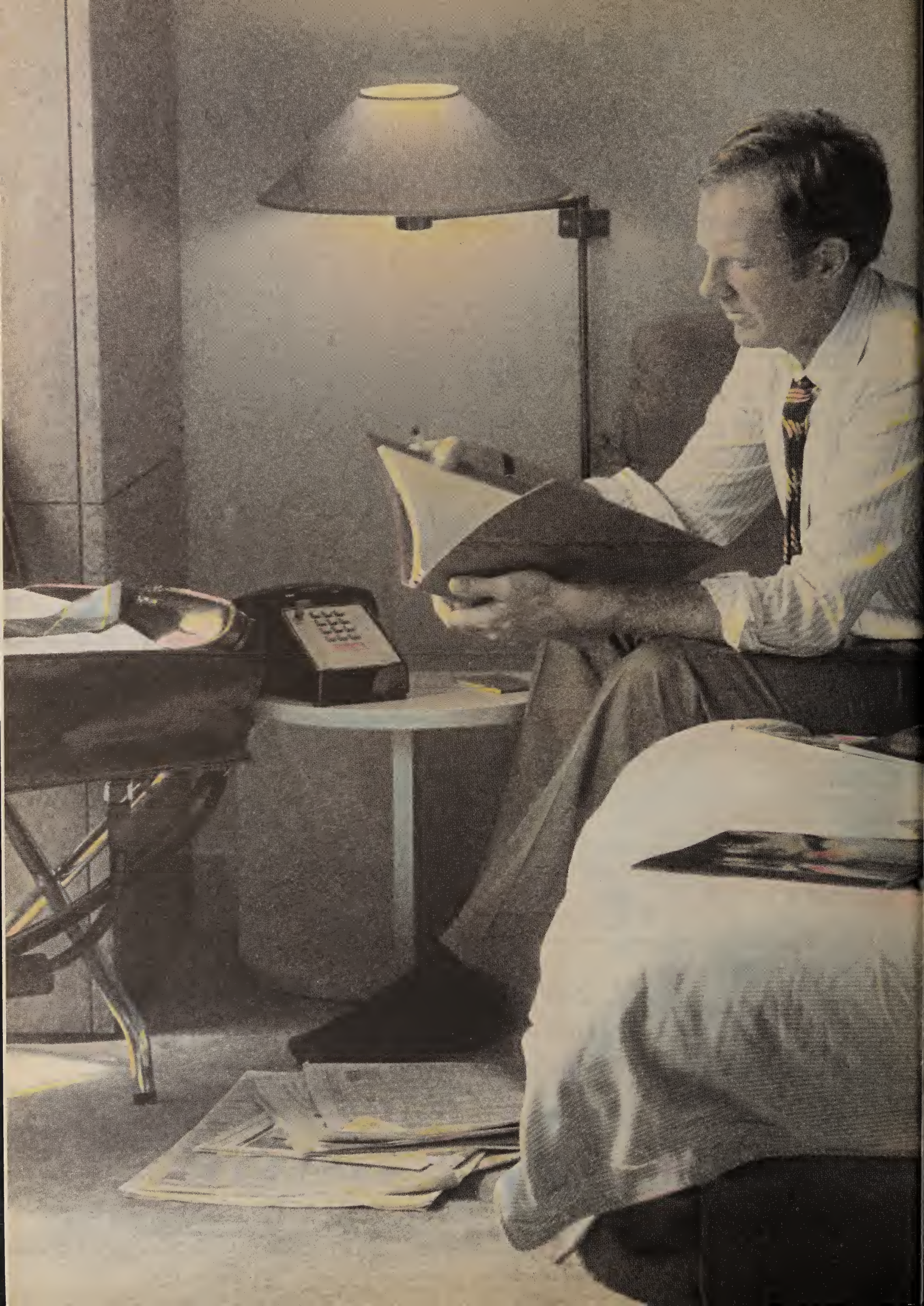
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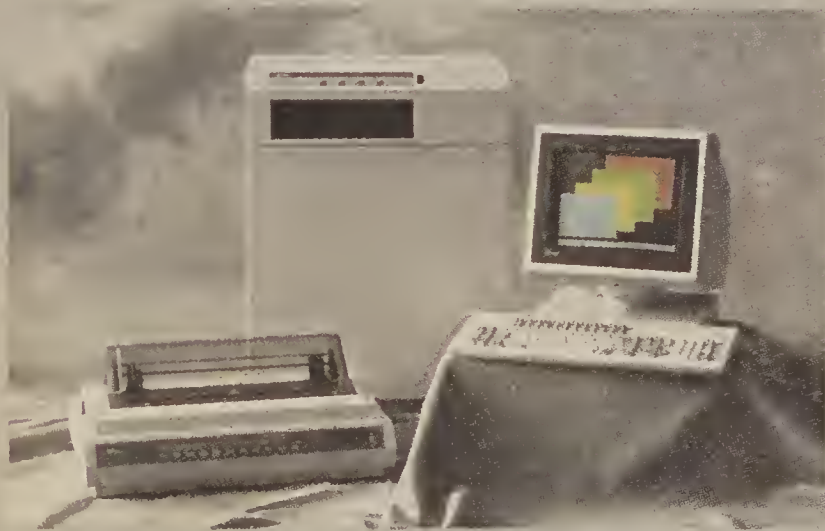




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I can see he's excited, but all he says is, 'You won't believe this.' It seems that what IBM didn't do — AT&T's been doing for a year. Namely, connecting Sync and Async environments. Now all our guys who need numbers from the VAX down the hall and the 3083 at corporate don't have to hop back and forth between displays. Now they can get the numbers they need to close a sale while they've got a customer on the line. Booth 16-B hadn't been real high on my list. AT&T's booth. Now here they are playing in IBM's park. And hitting home runs.*

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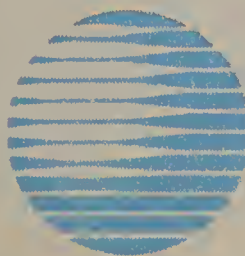
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Boston banker

CONTINUED FROM PAGE 61

University and finance at Harvard Business School before working in finance and insurance at Ford Motor Co. and then joining Ameritrust.

But Rogers "can get pretty nitty-gritty on anything he puts his mind to," Osenar says, commenting on Rogers' move into the systems field. "He downplays specific knowledge and projects himself as a generalist." Rogers can challenge employees even in an area in which he is not an expert, Osenar adds.

Rogers says that, in his current post, he spends about half his work time with "the top 15 guys" at Bank of Boston,

which, with \$31.1 billion in assets, is the 13th largest U.S. commercial banking company. He reports to Ira Stepanian, the president and chief executive officer.

Rogers says he has four principal duties. One is ensuring "a desirable technical environment" that emphasizes connectivity, which he defines as "the ability to get whatever data out of whatever structures it may be in, in whatever location, through whatever kind of terminal."

Second, there are strategic initiatives, such as artificial intelligence and image processing. These can be identified in a number of ways — by executives, employees or vendors — and tried out on a project basis.

A third task is managing personnel, making sure the company has the neces-

ROGERS "can get pretty nitty-gritty on anything he puts his mind to."

PETER OSEANAR
AMERITRUST

sary strengths — including designated backups for key executives — and accommodating transfers among divisions.

Finally, Rogers oversees integrated capital and operating budgets for systems.

Development and operation of systems is decentralized among Bank of Bos-

ton's five divisions. Martin, the head of retail systems, says Rogers' major contribution has come from his ability to build a team of top divisional executives. "He has been able to maintain the advantages of decentralization yet maintain a cohesive whole to support the corporate agenda," Martin says. "That has been driven through his energies and efforts."

One way of doing that has been assigning the top divisional systems executives some responsibility for corporate systems activities, such as human resources, telecommunications, architecture or strategic initiatives.

Rogers' organization is now forming committees of top divisional managers and technical specialists to address such areas. This helps coordinate the divisions by enlisting line managers rather than building a corporate staff, Rogers says.

Rogers stresses the importance of bringing business acumen to running systems, but he does not advocate the chief information officer concept and says there is great confusion over it.

"The bulk of management information is financial in orientation," and the role of providing that "is and will continue to be the purview of the chief financial officer," he says.

"I personally view [the CIO concept] as more a present, urgent management task than as a long-term continuing requirement, and I therefore see the chief information officer as a flash in the pan, something that will be talked about and dealt with and maybe even elevated to very high management status in an organization until the problems of connectivity and data interchange are really fixed," he says.

Rogers says the C-grade *The Wall Street Journal* gave the banking industry's automation efforts this year is "right on." The industry has done a fine job of automating transactions, he says, but is lacking in "mission-critical systems" to help market products, generate better products, respond to customers and sharpen decision making.

Developing such systems requires someone who understands both the banking business and what technology can do, Rogers says. "But that person's primary emphasis is understanding the business," he adds.

Rogers credits Bank of Boston with having an awareness of such issues and a commitment to addressing them. He says its decentralization three years ago has forced business managers and systems people to speak and work together more.

The company is rolling out its Corporate Banking Services System, a data base that integrates information from various systems and enables "an incredible number of questions relating to marketing information and credit information, both by organizational unit and by portfolio," Rogers says. He envisions development of systems that are themselves products rather than support tools for products.

Rogers says his basic role in such efforts is playing "orchestra conductor and getting disciplines to talk to one another and contribute something meaningful to the whole." In part, this means simply spending time talking with people in the divisions.

"What I bring to the equation is ensuring that the individuals work more closely together," he says. "My job is to tear down walls. . ." — he pauses — ". . . and to keep a focus on the end objectives."



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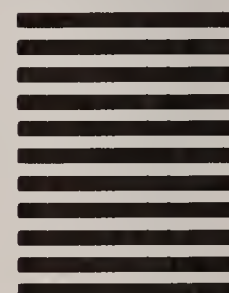
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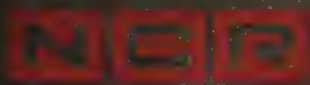
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Reed

CONTINUED FROM PAGE 61

for finishing projects ahead of schedule and under budget. However, he was considered a slave driver by the workers and a political opportunist by peers. Everyone, with the exception of upper level managers, disliked working with this person. And although the projects were within budget, they failed to satisfy users' requirements.

Since all of these problems went unnoticed by upper management, the manager was repeatedly rewarded and used as an example for others to follow. When the manager was promoted, the department was in an uproar, and resignations

soon followed.

A second company implemented an annual employee attitude survey. The survey went beyond asking about the food service, parking spaces and office furniture; it focused on the employees' feelings about their direct manager, company policy and other levels of management in their department. The surveys were completed anonymously, and all essay-type responses were retyped before the results were distributed to managers.

To ensure that the remarks about the managers and workers were consistent, the department frequently reorganized project teams to get different perspectives on the same project leader or manager. And it wasn't unusual for program-

mers to be reviewed by two project leaders or managers in a three-year period. If reviews were consistent, despite changes in management and programmers, any actions based on them were considered to be well-founded. Any inconsistencies required further investigation.

Quiz kids

Typical questions concerned the ethics, work habits, management skills, knowledge and interpersonal skills of managers. Some of the essay questions asked employees what they planned to do to resolve some of their managerial problems. It wasn't unusual for an employee to state that he couldn't stand his manager and that he was interviewing with oth-

er companies.

After two years of negative surveys by two different project teams, one manager was relieved of all managerial duties and given a nonmanagerial special projects staff position. Six employees had indicated they either wanted to be "traded" or were interviewing.

This company employed the basic philosophy of professional athletic teams: It's cheaper to get rid of a bad manager than to replace an entire team.

Too late

It's unfortunate, but most companies don't ask for an employee's opinion until his exit interview. At that point, it's too late to do anything to keep a valued worker, and, for the most part, the interview responses are taken lightly and rarely lead to corrective action.

This was the case with the first company. For every employee who resigned, management would discount anything said during exit interviews as the remarks of yet another disgruntled former employee. It wasn't unusual for management to suddenly downgrade a final performance review to back up its claim. Needless to say, the company suffered high turnover and low morale.

At the second company, when an individual was promoted, there was general agreement that he deserved it. The promotion was based on consistent management performance reviews and the staff members' attitude surveys. This type of cooperation can lead to higher quality systems, lower employee turnover, lower employee training costs and improved morale.

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Sears CIO

CONTINUED FROM PAGE 61

work has been done, there is a great potential to do much more," Fairweather said.

Brennan said in a statement that the new post will enhance the ability of Sears to use information technology as a strategic management tool and will strengthen its development of an integrated, cost-efficient structure for information technology.

The business units' information systems, like other functions, are highly decentralized. Company officials have not determined who will report to Moran, although line

managers generally report to superiors within their unit rather than to a corporate executive, Fairweather said. "It's just too soon to spell out how that's going to work," he said, adding, "We don't try to run things from corporate."

Since last year, Moran has been Dean Witter's senior executive vice-president and chief administrative officer.

He was previously president and chief operating officer of Sears World Trade, Inc., vice-president for corporate planning at Sears, Roebuck and Co. and vice-president for operations at Sears Merchandise Group.



Moran

COMPUTER INDUSTRY

INDUSTRY INSIGHT

Alan Alper

A match made in heaven



It was the day before the one-year anniversary of the renaming of Sperry/Burroughs to

Chairman W. Michael Blumenthal came to New York to disclose another acquisition proposal: the \$300 million stock swap for Timeplex.

Unlike the Burroughs purchase of Sperry, in which building critical mass was the motivation, the driving factors in this proposed purchase concerned adding complementary technology and business acumen.

Blumenthal wanted Timeplex, a \$147 million telecommunications firm specializing in T1 technology, to help Unisys develop wide-area networking expertise in the real world of multivendor environments. The confluence of computer and communications technologies was never more apparent.

In Blumenthal's words, the "complementarity" of the two firms would help Unisys achieve a leadership role in wide-area networking, a business in which no one company dominates. Unisys craved Timeplex's networking technology, which could enhance its competitive position against IBM, DEC and others for Fortune 500 and government contracts that call for the linkage of dispersed processors over high-speed T1 lines.

Blumenthal took his cue from other leading computer and communications companies that have formed alliances of varying sorts to leverage research and development and marketing costs.

IBM's remarketing of Network Equipment Technologies' T1 multiplexers and Digital Communications Associates' acquisition of Cohesive Network are just two examples of this partnership phenomenon.

Timeplex seemed to be one of the last communications firms without a partner. The Woodcliff Lake, N.J., company had been shopping for a joint development and marketing ally since early this year and had reportedly spoken with a number of

Continued on page 69

AST looks to life after PS/2

Diversification pays off as systems sales surpass board business

BY JAMES A. MARTIN
CW STAFF

IRVINE, Calif. — The period after IBM's announcement of the Personal System/2 will be remembered by many players in the microcomputer peripherals business as a time of confusion. But in the eyes of AST Research, Inc., it is a time ripe for a comeback opportunity.

IBM threw a curve ball to third-party suppliers like AST with its well-equipped proprietary PS/2 models. Wall Street worried that AST and its competitors in the PC add-on market would now have only limited opportunity with the PS/2 and dwindling markets for the discontinued IBM Personal Computer, PC XT and PC AT series.



The A, S and T of AST Research: Cofounders Thomas Yuen (left), Albert Wong (center) and Safi U. Qureshey.

But AST says it had a solution before the problem appeared — making its own IBM-compatible systems. The board business had

been AST's mainstay in the past, but it represented less than 40% of the firm's business for the quarter ended Sept. 30, with

systems business making up 60%, according to Robert E. Maples, AST's investor relations manager.

Such diversification is a natural evolution in the micro business, according to Safi U. Qureshey, AST's president and cofounder.

"Lotus Development Corp., Ashton-Tate and others started out with one area of strength and took a bottom-up approach toward future growth," Qureshey said. "It's not a new concept, and by addressing new, complementary markets using our same channels of distribution, we can achieve the same thing."

One year ago, AST introduced its first microcomputer, the Premium/286, which recently passed the 50,000-unit sales mark and is helping to offset the drop in income AST has experienced since IBM's PS/2 announcement in April.

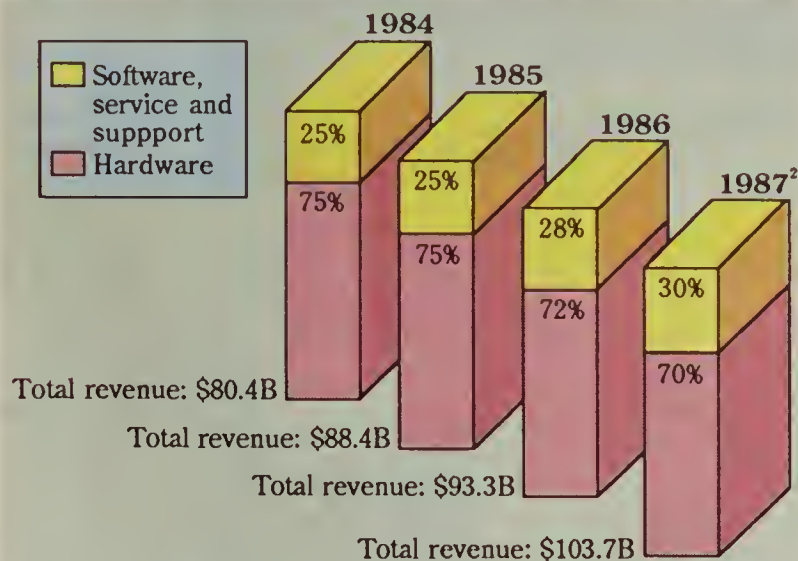
Last month, AST made a

Continued on page 68

Data View

Software makes its mark

Revenue breakdown for the top 16 U.S. computer makers¹



¹ Amdahl, Apollo, Apple, Compaq, Control Data, Data General, DEC, Hewlett-Packard, IBM, NCR, Prime, Stratus, Sun, Tandem, Unisys, Wang

² Estimated

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CW CHART: SUSAN T. TULLOCH

Motorola RAM chip output rekindled with Toshiba deal

BY CLINTON WILDER
CW STAFF

SCHAUMBURG, Ill. — In a classic case of "if you can't beat 'em, join 'em," Motorola, Inc. will resume production of dynamic random-access memory chips next year using mainly Toshiba Corp. technology.

Motorola, which left the dynamic RAM business two years ago like most other leading U.S. chip makers, said it will begin producing high-density chips storing up to 4M bytes of data. The chips will be primarily based on Toshiba designs.

The dominance of the world memory chip market by NEC Corp., Toshiba, Hitachi Ltd. and other leading Japanese chip ven-

dors recently prompted a U.S. exodus from that business and trade sanctions against the Japanese by the U.S. government.

But Motorola and Toshiba agreed earlier this year to share design and manufacturing technology, creating the semiconductor industry's most prominent example of U.S.-Japan cooperation. Last week's announcement was a logical outcome of the agreement, according to Victor deDios, a memory chip market analyst for Dataquest, Inc. in San Jose, Calif.

"Motorola left the business because they were not able to catch up in the 64K-byte and 256K-byte markets," he said. "Toshiba is probably the tech-

Continued on page 68

DCA: Ungermann-Bass pair-up still possible

BY KATHY CHIN LEONG
CW STAFF

ALPHARETTA, Ga. — Although Digital Communications Associates, Inc. (DCA) has dropped its current takeover bid for local-area network vendor Ungermann-Bass, Inc., the suit-or appears to be leaving the door open for a return visit.

Although DCA said it has no present plans to continue the pursuit, Craig Huffaker, DCA executive vice-president, noted, "We still think there is reason-

able synergy between the two companies. DCA may or may not decide to approach Ungermann-Bass. That cannot be determined yet."

DCA's \$175 million offer to acquire Ungermann-Bass ended quickly and abruptly when Ungermann-Bass directors unanimously rejected the acquisition offer earlier this month [CW, Nov. 16]. But DCA still owns one million shares of Ungermann-Bass stock, equivalent to 5.7% of the Santa Clara, Calif. firm. Huffaker said DCA intends to keep

those shares and has not decided whether to buy more.

If DCA were to launch a future bid, it would repeat the pattern of the computer industry's largest acquisition — the 1986 buy-out of Sperry Corp. by Burroughs Corp. Burroughs abandoned its first attempt in 1985 when Sperry balked and the purchase price rose too high, but returned one year later in a move that many observers said caught Sperry by surprise.

Analysts watching the DCA drama unfold said they were not

surprised that the buy-out ended in a cloud of smoke. "I was against this deal all along," said Brad Baldwin, analyst at Dataquest, Inc. in San Jose, Calif. "The timing of this thing was very bad. No one likes to feel bullied into anything."

The DCA bid came soon after the historic stock market drop in October. But DCA had been considering approaching Ungermann-Bass with an offer months before the stock drop, Huffaker said.

Ungermann-Bass spokesman Gary Wetsel said the company has no plans to be merged with any company at this time.

AST

CONTINUED FROM PAGE 67

splash by introducing its follow-up micro, the Premium/386. With a proprietary bus structure that reportedly combines the multiple processing feature of IBM's Micro Channel architecture with a PC AT bus, the Premium/386 could make AST a serious contender in the hotly competitive AT-compatible marketplace.

The company's move into the micro-computer systems market has generally been well received by users and analysts. But AST's effort to diversify beyond its traditional business has had its costs as well.

While AST reported worldwide sales

“WE COULD HAVE released an AT computer years ago. But we have a desire to be the leading company, and the question is not who can come out with the first board, but who can do it best.”

SAFI U. QURESHEY
AST RESEARCH, INC.

of \$78.6 million for its first fiscal 1988 quarter ended Sept. 30, a 96% increase over the same period last year, net income has continued to drop for the past 12 months.

This year's second-quarter profit of \$3.7 million dropped to \$3.3 million in the third quarter and to \$2.8 million in the

fourth quarter. Net earnings for the first 1988 quarter plunged to \$72,000, or 1 cent per share, compared with \$3.1 million, or 27 cents per share, during the first quarter of 1987.

AST attributed the decline to expanded research and development expenditures and disappointing add-in board sales

for the PC line.

Some 18 months ago, AST began investing in surface-mount technology, an expensive process that would enable the company to cram more functions onto smaller circuit boards and provide smaller desktop footprints. The costs associated with diversifying into new markets have also weighed into its losses.

Price cutting hurts

In some ways, AST's rising revenue and falling profits are simply the reflection of the oldest business game in town — price cutting. By pricing its Premium/286 lower than most AT-compatible competitors — \$1,995 and up — AST was able to gain attention in a crowded market while at the same time crippling its earning potential, according to Blake Chiles, a research analyst for Bateman Eichler, Hill Richards in Los Angeles.

“They have an excellent product, but they stumbled somewhat with the price,” Chiles said. “It's been very successful, but they introduced it a little too much on the cheap side in regard to demand.”

Besides microcomputers, AST recently entered the desktop publishing arena with an Adobe Systems, Inc.-licensed laser printer and has released a variety of communications add-in boards.

The company is also shipping Microsoft Corp. MS-DOS-based cards for the Apple Computer, Inc. Macintosh. And through the 1986 acquisition of Camintonn Corp., AST began its move into the Digital Equipment Corp. VAX add-in board market.

Markets such as desktop publishing and AT compatibles are already crowded with vendors and are becoming increasingly competitive. The trick for survival is to offer more than the “me-too” mentality, Qureshey said.

“We could have released an AT computer years ago,” he said. “But we have a desire to be the leading company, and the question is not who can come out with the first board, but who can do it best.”

Despite its push to diversify, AST is still serious about its add-in board products, officials insist. By having a presence in the IBM, Apple and DEC markets, AST will be in a good position to provide interconnectivity between the three computing environments, according to Albert Wong, executive vice-president.

“A key strategy for us is to understand the issues behind all three of those markets,” Wong said. “A successful enhancement board company needs to know those markets and offer products that can coexist with the existing standards.”

Toshiba

CONTINUED FROM PAGE 67

nology leader in dynamic RAMs, and the potential market for 1M-byte and higher density chips is big and getting bigger all the time.”

The agreement gives Toshiba licensing rights to produce Motorola's flagship 68000 series microprocessors, which are the industry standard for the Apple Computer, Inc. Macintosh and most Unix-based engineering workstations.

Motorola said it will resume dynamic RAM chip production next year in Mesa, Ariz., Austin, Texas, and East Kilbride, Scotland. In addition, Motorola and Toshiba are building a semiconductor plant in Japan.

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Alper

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companies, including IBM and AT&T.

Last spring, Timeplex Chairman Ed Botwinick spurned IBM's entreaties for an OEM deal on the grounds that doing business with Big Blue would restrict Timeplex's latitude with its largest customers. Instead, Botwinick reportedly asked to be acquired. IBM wasn't interested.

Sought deep-pocketed partner

Botwinick knew that as a medium-size company in the increasingly competitive telecommunications business, Timeplex needed a deep-pocketed partner to fund R&D and broaden its captive customer base. Unisys, a \$10 billion behemoth, seemed to be the only major computer maker left that fit the bill.

Ashton-Tate revenue up

BY STEPHEN JONES
CW STAFF

TORRANCE, Calif. — Ashton-Tate Corp. last week reported record profits and revenue for the quarter ended Oct. 31, but the numbers were not enough to help the company keep pace with microcomputer software front-runners Microsoft Corp. and Lotus Development Corp.

Ashton-Tate's 18% growth in revenue lagged considerably behind the 54% jump in quarterly revenue tallied by both Microsoft and Lotus last month.

"People were looking for higher revenues because of what Lotus and Microsoft did," said Bruce Johnston, an analyst with First Boston Corp. in New York. Failing to meet such expectations might have contributed to the two point drop in Ashton-Tate stock — from 19½ to 17½ — after the report was issued.

The company reported revenue of \$68 million for its third fiscal quarter, up from the \$57.7 million reported for the same period last year. Net income rose 41% to \$11.1 million this year, while earnings per share increased by 12 cents — from 32 cents for the same quarter last year to 44 cents this quarter.

Loss of market share reflected

Analysts blamed the relatively low increase in Ashton-Tate's revenue on the company's continued loss of share in the relational data base market. Since the April quarter, Ashton-Tate has seen its command of that market slide as users have opted for alternative data base programs from developers such as Sybase, Inc. and Nantucket, Inc.

Johnston speculated that sales for Dbase III Plus, Ashton-Tate's flagship product, might have dropped slightly in the third quarter after remaining flat at about the \$40 million mark for the last several months.

"Dbase III Plus is in the late stages of its product life. . . . Ashton-Tate needs a new product," Johnston said. He added that the company should grab back a lot of its lost market share when a Dbase upgrade is released at the beginning of next year.

On paper, then, this seems to be a match made in heaven: a large computer company sans wide-area network smarts taking over a leading communications vendor lacking capital. After the consummation, Unisys will effectively elevate communications to a top priority by creating a business unit, called Unisys Networks, to be run by Botwinick.

Botwinick, a fiercely independent-minded chief executive credited with transforming Timeplex from a small, unknown company into a very profitable, fast-growing concern, would also become a corporate vice-president and spearhead Unisys's networking strategy.

He may be getting a bigger hassle than he bargained for, however.

At least initially, Timeplex will be the only entity of Unisys Networks. Botwinick will work closely with, but will not run, the telecommunications functions within Unisys's other business units. That could frustrate the freewheeling Botwinick as he tries to respond quickly to changing market and technological conditions.

Potential pot o' gold

Yet the frustration may be worth dealing with. Blumenthal is reportedly considering other communications-related acquisitions. Botwinick could end up running a much larger entity than he ever would have if Timeplex had remained independent.

Moreover, Blumenthal, who was Sec-

retary of the Treasury during the Carter administration, is rumored to be interested in returning to government if the Democrats reclaim the White House next year. With longtime Burroughs second-in-command Paul Stern having recently departed, there is no longer an obvious successor.

It's unlikely that Botwinick would immediately become the leading candidate. But given the open-ended nature of the situation and Botwinick's fast track record, anything could happen.

Only time — perhaps with help from the American people's presidential choice — will tell.

Alper is *Computerworld's* Mid-Atlantic bureau correspondent.

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COMPUTER CAREERS

Late start for AI job market

As expert systems become more widely used, positions are being created

BY SHERYL KAY
SPECIAL TO CW



Artificial intelligence has long been touted as the "hot" technology, but positions for AI experts within corporate MIS departments are only now becoming numerous.

For example, the demand for technicians with a general AI background increased 35% to 40% on the East Coast between 1986 and 1987, according to Charlie Watt, associate director for Source EDP. "Our clients looking for AI talent are major corporate MIS departments in addition to the computer manufacturers and systems integrators of the past," he says.

The expansion ripple

The increased demand for AI professionals is being driven by the widespread implementation of expert systems in a variety of industries, ranging from telephone service firms, such as GTE Data Services, Inc. in Tampa, Fla., to banking institutions, such as Manufacturers Hanover Trust Co. in New York.

Because of the variety of applications of AI technology — financial planning, loan approval, risk management and computer-

aided software engineering — job classifications for AI experts take many forms.

"Many firms use different titles even for expert systems developers," says Marilyn Dee, who runs a Cambridge, Mass.-based executive search firm specializing in placing AI professionals.

As a general rule, most AI development groups follow an eight-rung ladder, Dee says, beginning with a LISP programmer and moving on to the following positions: systems programmer, knowledge engineer, senior engineer, technical staff, project manager, individual contributor and, finally, manager. Salaries for such positions begin at about \$30,000 per year and can exceed \$75,000 for individual contributors and managers.

Required work experience for these jobs varies depending on the level of the position. A LISP programmer might need to possess one to three years of "real world" programming experience, utilizing the LISP language, strong knowledge of C and experience with Symbolics, Inc., Digital Equipment Corp. or Texas Instruments, Inc. hardware.

The knowledge engineer, on the other hand, may never write programs in the work environ-

ment; however, he will need to possess a great deal of interpersonal communications experience and some mathematical or other modeling knowledge.

Elizabeth Byrnes, vice-president in the Strategic and Techni-

WE OFTEN LOOK for people with experience in blackboard architecture, knowledge-based systems, machine learning and natural language processing."

MARTHA GARMANIAN
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cal Research Department of Manufacturers Hanover Trust, heads up the Expert Systems Group, composed of all types of positions. "My own background is in clinical psychology," she says, "but we've also got people here with employment backgrounds that include LISP programming, banking operations and corporate MIS business systems development."

For most companies, the more AI-oriented academic credentials a candidate possesses — particularly a master's degree or Ph.D. — the better his chance of obtaining a position.

Boeing Computer Services Corp.'s Advanced Technology Center in Bellevue, Wash., calls

all of its professionals in artificial intelligence development "AI specialists," says Martha Garmanian, a Boeing personnel representative. For the past three years, Garmanian has recruited for Boeing's AI group. "We often look for people with experience in blackboard architecture, knowledge-based systems, machine learning and natural language processing," she says.

Bob Walford, manager of ad-

explore and understand the expert. Your conventional Fortran programmer wants to know what the syntax is and where the register numbers are."

Building AI muscle

MIS recruiters advise professionals who are interested in becoming AI developers to augment their existing skills with AI tools.

At Manufacturers Hanover Trust, for example, an individual whose department is now working in conjunction with Byrnes' group may be able to make the transition to an AI position.

"We are applying AI technology to investment and corporate banking and operations," Byrnes says, "but not all the departments are used to the risk and uncertainty of using AI tools."

Finding such AI technology in the back corner of the average MIS shop may not be possible, however. So professionals seeking AI skills may turn to academic centers. Among schools with well-recognized AI programs are the Massachusetts Institute of Technology, Stanford University, Carnegie Mellon University, the University of Pennsylvania, the University of Michigan and Duke University.

Recruiters also recommend attending professional development seminars on AI and even purchasing an inexpensive personal computer AI package to gain some initial exposure.

Kay is a Tampa, Fla.-based free-lance writer.

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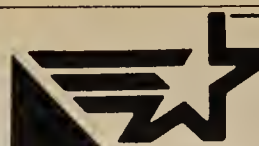
Michigan Technological University is an Equal Opportunity Educational Institution/Equal Opportunity Employer.

PROGRAMMER ANALYST

Rapidly expanding suburban Kansas City Laboratory seeking a programmer analyst with 3-5 years experience. Applicants with Honeywell Bull; DPS/7-DPS/7000-DPS/6 hardware/software background is preferred. We are a progressive publicly traded company established in 1972 seeking motivated individuals to grow with us. We offer a salary commensurate with experience and a complete benefits package including medical, dental, retirement and more. Relocation assistance available. Send resume and salary history to:

Gene Hart
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COMPUTER SCIENCE - Applications are invited for an opening at the Assistant Professor level. The Department offers masters and baccalaureate programs in Computer Science with a current enrollment of approximately 300 majors. A doctorate in Computer Science or a doctorate in a closely related area and a masters degree in Computer Science is required. All areas of specialization within Computer Science will be considered. Duties include both graduate and undergraduate teaching plus scholarship and service. Research is encouraged. Applications will be processed until the position is filled. Send resume, names of three references, and transcripts to Office of Academic Affairs, Computer Science Search, Western Kentucky University, Bowling Green, KY 42101. An affirmative action, equal opportunity employer.



DATA PROCESSING OPPORTUNITIES

The Georgia Division of the Lockheed Aeronautical Systems Company has immediate career opportunities for Data Processing professionals in the following areas:

● IBM COBOL/FORTRAN APPLICATION PROGRAMMERS

Requires two years COBOL and/or FORTRAN application programming experience. Finance applications run on IBM 3090-200. Software: MVS/SPI, TSO/ISPF, VS/COBOL, VS/FORTRAN, ACF2.

● TANDEM SYSTEM PROGRAMMERS

Positions require two or more years experience in system software support for Tandem TNSII/TXP. Capabilities should include general System Management skills, System Resource Management, PATHWAY, TAL, System Tuning, and a good background in general data communications. Experience in BASIC, COBOL, and FORTRAN is beneficial.

We offer a stimulating and challenging work environment in an atmosphere that encourages innovation and excellence. Our convenient Marietta location offers a myriad of recreational, cultural and entertainment opportunities, and Lockheed salary and benefits plans are excellent. Applicants should send resume and salary history, in confidence to: **LOCKHEED AERONAUTICAL SYSTEMS COMPANY, GEORGIA DIVISION**, Professional Employment Department 90-31-432, Marietta, Georgia 30063.



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WASHINGTON STATE LEGISLATURE Olympia

POSITION ANNOUNCEMENT COORDINATOR LEGISLATIVE SERVICE CENTER

The Washington State Legislature is seeking a manager to direct the activities of the Legislative Service Center. The Center operates in an IBM 4381/Mainframe (VM/VS1) environment and provides information services, equipment, training, and support to the Legislature.

Responsibilities of the position include managing a staff of 20 data processing professionals engaged in systems development, data base administration, programming, software and hardware evaluations, maintenance and repair, and user support.

Desirable qualifications include 5 years' management experience (supervising a staff of 10 or more) in a data processing environment, and a comprehensive understanding of mainframe and microprocessing systems.

The ideal candidate will possess strong communication and interpersonal skills and the ability to develop and implement a long-range system plan in a rapidly changing environment.

Salary will be commensurate with professional experience and education. Interested parties should send a letter of application, resume with salary history, and three references to:

LSC Search Committee
c/o Mr. Robert F. Batdorf
Executive Consulting Group, Inc.
600-108th Avenue N.E., Suite 901
Bellevue, WA 98004-5198

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Programmer/Analyst - responsible for analyzing, designing, implementing, & maintaining systems utilizing MV8000, MV20 hardware and ADS/VS, COBOL software. Bachelor's Degree in Commerce/Computer Science. 1 year experience doing above. 40 hours/week. \$28,000/year. Send resume: Job Service, JO #NC7605026, DOT Code 012.167-066, 500 W. Trade St., Charlotte, NC 28202 or nearest job service office.

SENIOR SYSTEMS ANALYST

We are seeking a qualified Senior Systems Analyst to work in our IBM 3083 environment. Applicants should possess superior COBOL and CICS skills as well as experience in payroll applications maintenance and development. VSE and GENER/OL experience will prove helpful. Salary range \$28,857 to \$43,285 per year. Send detailed resume and salary requirements to:

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Titusville, FL 32781-0342

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Software Engineering Manager

Your responsibilities will include managing a department of software engineers in the development of software products for revenue.

Ideal candidate will have established track record in the leading development of complex systems software for an MVS/VM operating system environment. Position requires a BS/MS in CS or equivalent, with a minimum of 14 years experience.

MVS and VM Software Engineers

You will be responsible for the design and implementation of advanced storage management software products to run on IBM mainframes.

Ideal candidates will have a BS or MS in CS or equivalent, plus experience with IBM/370 assembler language coding and knowledge in MVS and/or VM internals. Openings exist at all levels.

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WINDOW SYSTEM PROGRAMMER (UNIX) LAB FOR COMPUTER SCIENCE

To maintain and evolve the X Window System in an environment to include Apollo, DEC, HP, IBM and Sun workstations. Responsibilities, shared among a small team, include maintaining all system components (graphics device layers, servers, fonts, language interface libraries, toolkits, applications, demos and documentation) producing periodic software releases, handling contributed software, responding to electronic mail about the system, and participating in the design and implementation of new extensions, toolkit components, and applications. Significant interaction with a wide variety of industrial sponsors will be required.

Applicants should have a Bachelor's degree or equivalent combination of education and experience; be proficient in C programming in a UNIX environment; be familiar with some modern window system and with window system principles in general, and must be able to work as part of a small team while being an effective participant in the national multi-industry/university development group. Experience with a X Window System, graphics implementation methods, and large system maintenance is very desirable; also familiarity with Common Lisp, Ada, Fortran, network protocols and with graphics standards such as PHIGS. MIT is a non-smoking environment.

Interested candidates send two copies of resume and cover letter to: James McCarthy, MIT Personnel Office (E19-238), 400 Main Street, Cambridge, MA 02139. Refer to Job #R87-425, and R87-426.

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Manager, Storage Management

This is a key role involving the management of a staff of five for the Storage Management area. You will be chartered to create data management methodology to support shared DASD in multi-locations. You must be able to utilize all current technologies and data management tools such as DMS, ICFRV, STOPX37, FDR/ABR, FASTDASD, TMS, HMS.

Manager, Library Management

This is a key position responsible for all library management functions and tools as well as supervising a staff of 5. You should have experience with the MVS operating systems. Stratus also helpful. Experience with LIBRARIAN, SOFTOOL, PANVALET, CCC desirable. You will interface with all levels of management. 5+ years' experience required.

Technical Services

MVS/XA Systems Programmer

We are seeking a key person for the Operating Systems Support Group in our Technical Services Department. Responsibilities will include support for MVS/XA and JES2, running in a shared multi-CPU IBM 3090 mainframe environment. The successful candidate will have 5+ years' experience maintaining MVS/XA and related program products. Strong problem determination skills. VSAM, ALC and configuration management knowledge are essential. Familiarity with UCCEL Products and experience with remote data center support is a plus.

Communication Services

Senior Data Communications Analyst

This is a key position responsible for planning, designing and implementing data communication network components on a project basis. As a Data Communications Analyst, you will confer with users to determine requirements, coordinate vendor activities, develop project schedules, perform acceptance tests and provide technical support. Qualifications: related degree or equivalent experience, 6 years' data communications experience and a working knowledge of T1 technology, SNA, SDLC, asynch and bisynch protocols.

Senior Voice Communications Analyst

An opportunity exists for an individual who possesses a strong understanding of traffic engineering principles. The successful candidate should have experience with the preparation and evaluation of RFP's for voice telecommunications systems. Project management experience and ACD experience preferred.

Fidelity offers excellent salaries and a comprehensive benefits package including performance bonus, profit sharing, thrift savings plan and 100% tuition reimbursement. We also encourage participation in our generous Employee Referral Program.

These and other positions within Fidelity Systems Company are available in downtown Boston. For prompt consideration, please send your resume to Caroline McGrail at Fidelity Systems Company, Dept. CW1123E, 82 Devonshire Street, Mail Zone E11B, Boston, MA 02109. An equal opportunity employer, M/F/H/V.

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Engineering Programmer to convert civil and structural engineering problems to format processible by computer; Design, Develop and Analyze computer software to interface with users to define requirements and develop or exchange programs and systems; process complex algorithms to execute programs; prepare cost and schedule reports from initial project information or actual working drawings; utilize above information to create and optimize space layout in accordance with client specified requests and efficient layout requirement; create plans, elevations and layout for presentations to clients. Must have an MA in Civil Engineering; 2 years experience; knowledge of advanced mathematics; understanding of computer capabilities and limitations; familiarity with 2 and 3 dimensional analysis obstructors; knowledge of AISC, AASHTO, and ACI code; and knowledge of applications that involve large amounts of graphical construction. Monday - Friday 9 a.m. to 5 p.m. Salary \$24,00 per year. Submit resume only to Job Service of Florida, 701 SW 27th Ave., Rm. 15, Miami, FL Ref. Job Order FL#4539953.

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DATA PROCESSING

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So, if you're a DP professional who thrives on challenging yourself and exploring new systems, write us today.

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APT-AC post-processor implementation and enhancement. Requires 2 years experience in IBM APT-AC software development using FORTRAN, TSO, ISPF, JCL, and IBM Assembler and excellent math skills. Background using PL/1 and a BS degree in Numerical Control Technology, Computer Science or Mathematics preferred.

SCIENTIFIC PROGRAMMER/ANALYSTS

- Develop, implement, and support advanced manufacturing systems for shop floor, quality assurance, manufacturing engineering, and process planning applications. Requires a BS degree in Computer Science or related field and at least 2 years experience with C and UNIX, RDBMS and SQL knowledge is highly desirable.
- Develop, implement, and support advanced manufacturing process control systems for automated shop floor equipment. Requires a BS in Computer Science or related field and at least 2 years experience with FORTRAN and HP1000s running RTE and IMAGE.
- Develop, implement and support automated material handling systems for manufacturing applications. These systems include AGVs, ASRSs, and conveyor systems. Requires a BS degree in Computer Science or related field and at least 2 years experience with VAX, VMS, FORTRAN, PL/1, and C.

Please send your resume to Steven Martin, NORTHROP ADVANCED SYSTEMS DIVISION, Employment Office, Dept. CW2529, P.O. Box 1138, Pico Rivera, CA 90660-9977.

MODEM USERS: You can access a complete listing of career positions now available with your home computer and a modem. Dial (213) 938-5532 for 24-hour information. Bit settings: data 7, stops 2, no parity, full duplex 300/1200 baud (CR) upon entry.

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Keane is currently seeking high level software developers to interface with clients and work in challenging technical environments. To qualify, you should have:

- ☐ 5-10 years' programming and software design experience
- ☐ Strong S/370 assembler programming background and MVS
- ☐ CPCS
- ☐ MVS internals a plus

Based in Lexington, Mass., these positions offer long-term career opportunities, very competitive salaries and a comprehensive benefits package including health/dental/life, technical and management training, tuition reimbursement, pension plan, stock purchase, employee vacation condos and more.

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**MVS SYSTEMS
SOFTWARE SPECIALIST**

MORINO ASSOCIATES, INC., is a leading supplier of Information Systems Management products and services located in Vienna, VA. Due to our impressive growth, we are expanding our staff and need to hire a "shirt-sleeve" manager to work in our TSO/MON product area.

This individual will lead the enhancement and support of the TSO/MON product line. Responsibilities include project management, product promotion, hands-on product design, extensive assembler coding, testing, documentation, and customer support. Skills required include: Two or more years of personnel management with at least eight years in MVS systems software development or extensive system modification. Must be able to design, code, debug, and test large assembler coded systems, with extensive experience in MVS diagnostics, SVC and Standalone Dumps analysis, and possess and indepth knowledge of MVS/370 and MVS/XA system architecture.

We offer a complete relocation package, fully paid benefits for the employee and the dependents, competitive salary, incentive bonus based on performance, pension, and profit sharing. Qualified individuals should send their resumes to Mark C. Horning, Morino Associates, Inc., 8615 Westwood Ctr. Dr., Vienna, VA 22180-2215.

**MORINO
ASSOCIATES,
INC.****System 38
Senior
Programmer
Analyst**

A challenging position is available with Desert Hospital, a progressive 350-bed acute care hospital. The ideal candidate will have a minimum of three years experience in programming and system design, proficiency in RPG III and CL, and S/38 experience. Hospital experience is preferred.

We offer an excellent salary, ultra-modern work environment, and an outstanding flexible benefits package. For confidential consideration, please send resume with salary history to Personnel. PRINCIPALS ONLY, PLEASE.



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Hermann Hospital, located in the Houston, Texas Medical Center, has a growing Information Systems Department utilizing a large IBM mainframe and DOS/VSE operating system. We are currently seeking an Assistant Director of Information Systems.

In this position you would be responsible for Computer Operations, Technical Services and Applications Programming. The qualified candidate will have a minimum of 3-5 years of management experience in Information Systems. You must possess experience with large IBM hardware preferably in a healthcare environment. Knowledge of OS/MVS is a plus. A college degree is required and superb communications skills are necessary.

We offer an attractive compensation and benefits package. To apply, send your resume in confidence to: Hermann Hospital, Texas Medical Center, J. Allard, Human Resources Department, 6411 Fannin, CW-1123, Houston, Texas 77030.

**Hermann Hospital**

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The administrative computing office is seeking a user-orientated individual with strong analytical and programming skills to provide support for a wide range of software applications. This support will encompass both third and fourth generation methodologies, as well as the provision of training and documentation to the end-user community.

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To apply, please send your resume by December 4, 1987 with salary expectations to:

David Jurk
Director of Administrator Computing
University of Lowell
South Campus
Lowell, MA 01854

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Computer Analyst Positions — Engineering Code Development

Washington State

Advanced Nuclear Fuels Corporation, a Washington State based company specializing in Nuclear Fuels Engineering and Manufacturing, is seeking qualified CDC or Cray experienced candidates for two positions.

Positions provide design and implementation of automated code control and maintenance techniques as well as development and engineering production calculations.

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Requires BS Engineering, Math or Applied Science and 10 years' experience with large scale computer codes, application systems or operating system development. Experience with CDC or Cray computers and knowledge of FORTRAN, code control, code maintenance and QA techniques is required. Must know operating system, computer hardware, code design, code implementation problem diagnosis and operational analysis.

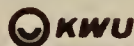
Lead Analyst

Requires BS/MS Engineering, Math or Applied Science and 10 years' experience with large scale computer codes or application systems on CDC or Cray computers. Must have working knowledge of code control, code maintenance, QA techniques and be fluent in job control language, procedural language, FORTRAN and scientific programming. Demonstrated skills in project management and software system design.

Qualified candidates please send resumes to: **Advanced Nuclear Fuels Corporation, Employee Relations, P.O. Box 130, Richland, WA 99352.** We are an Equal Opportunity Employer.

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This position requires a proficiency in SMP/E and SYSGENS in a multiple systems environment. The ability to diagnose and correct problems is a must; VTAM, JES III and SPF experience is desired.

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You must have experience in any of the following: System 36 or 38, RPG II and RPG III, COBOL, "C" or UNIX with Informix/SQL or ORACLE.

SYSTEM SOFTWARE DEVELOPERS

To qualify, you should have a strong background in IBM Assembler Language, and experience in one or more of the following: SGML, INTERLEAF, Systems Software Architecture, CCITT 3&4 Graphics Compression, Integrated Publishing Software Development or Government Electronic Printing/Publishing Development.

We offer relocation assistance, and an excellent salary/benefits package. To find out more about these opportunities, call us at: 1-800-243-0420. (Inside Florida, call: 305 660-8400).

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As a result of upgrading our technology and converting to an IBM 3090 MVS/XA system we have entered into a significant expansion program. This includes embarking on a major systems development program with DB2 relational data base.

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Individual will be responsible for implementing IBM's CSP/DB2 relational software which will pave the way for a complete new portfolio of applications systems to be developed. Will play a major role in a team effort associated with new systems development, including the establishment of data architecture and data security guidelines. Must be skilled in relational data base architectures, with 2 years DB2 experience. This is a key management position within the Information Services team.

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Individual will be responsible for data base structures and design, data security, design-for-performance criteria, and will assist the applications development staff in the implementation of a broad range of new business systems. Your background must include experience as a Data Base Analyst/Administrator in a relational data environment, preferably DB2. Those in an EDP Audit position who have relevant data base experience are encouraged to apply.

CICS Systems Programmer

The individual should come from an IBM MVS/XA environment with a minimum of two years in depth experience in the installation and implementation of CICS/VS and a background in NCP/VTAM. Additional experience in JES2, ISPF, RACF and SMP/E would be a definite plus.

MVS Change Control Specialist

Individual will be responsible for coordinating all software and hardware changes within the Data Center and control the movement of application changes into and out of production libraries. Successful candidate must have strong working knowledge of MVS/XA, JCL, JES2 and TSO/ISPF/SDSF. In addition, individual should have a minimum of two years experience in production control functions and possess a two year degree in Data Processing.

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Manages computer center and college wide MIS activities. Bachelor's in Business Administration, Computer Science or closely related field is required, together with 5 years of relevant work experience including a background in the development and implementation of manual and automated management information systems. Equivalent combination of education and experience will be considered.

Salary: \$ 32,565-\$39,226, commensurate with qualifications.

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Software Engineer. Develop new software to provide feature enhancement to communication server products, including software design, coding, testing, documentation and formal release; provide software support for products, incl. analysis of software problems, corrective coding, testing and documentation. Requires: M.S. in Computer Science and 1 year software development experience OR B.S. in Computer Science and 3 years software development experience. Also requires the following: knowledge of data communications concepts and experience in ISO, TCP/IP, or SNS; knowledge of multi-tasking operating system internals; experience with message-based interprocess communication; knowledge of UNIX and experience with software configuration management under UNIX, and experience using "C" programming language. Salary: \$37,000/yr. Send this ad and a resume to: Maureen Dworak, Human Resources Generalist, 2081 Sterlin Road, Mountain View, CA 94043, no later than December 8, 1987. Must have legal right to work. EOE.

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LAI has immediate openings for software developers who have worked with System V or 4.[2,3]BSD versions of the UNIX operating system for 3 or more years. If you have demonstrated experience in kernel programming, network protocol development/support, or System V STREAMS, your talents can be used on the following:

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Opportunities also exist for experienced project leaders and technical writers.

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Bjorn Nordemo
Vice President
Data Arts & Sciences, Inc.
Weston, MA

Bjorn Nordemo is Vice President of Data Arts & Sciences, Inc. (DASI), a contract software agency based in Weston, MA. Although they place people in permanent positions, DASI most often places 'contract programming personnel' — consultants who fit special niches for short or long term commitments in corporations in the New England area.

"Our agency specializes in finding computer consultants — designers of systems, evaluators of hardware and software requirements, and computer programmers to mention a few. We recently were introduced to Computerworld as a potential source for finding these consultants," states Bjorn. *"I liked the idea because I know Computerworld has a broad reach — from MIS/DP directors to computer programmers, in multiple industries and multiple markets — and that's what DASI needs."*

"We had four specific positions for MIS/DP consultants that we needed to fill in northern New England. We used the local newspaper on a weekly basis, but people who are willing to move usually aren't reading the local Sunday paper. So, I felt this was a perfect opportunity to try Computerworld," says Bjorn.

According to Bjorn, he's quite satisfied with the results. *"From Computerworld, we filled 75% (3 out of 4) of the positions with the responses from the first week, and the remaining position with the response from the following week. These results alone made my ads in Computerworld worthwhile."*

And Bjorn also recognizes a second benefit to advertising in Computerworld. *"The beauty of using Computerworld is that it's read by people in the computer industry who have a need for consultants, as well as being read by consultants who need to keep up to date on the marketplace,"* says Bjorn. *"So we not only reach qualified candidates to fill our current openings, but we are creating awareness of the services that DASI has to offer,"* says Bjorn.

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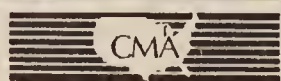
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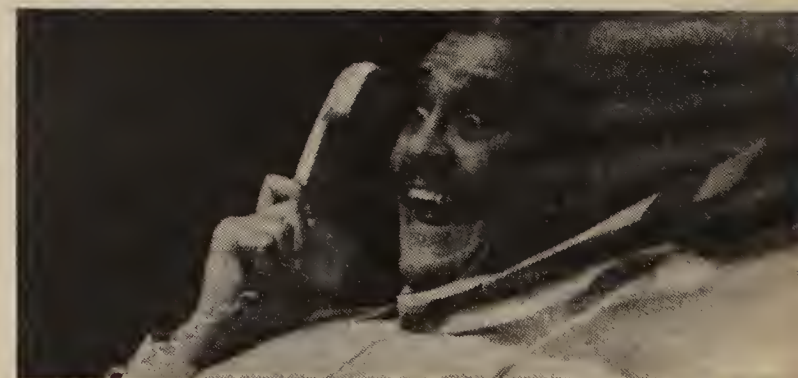
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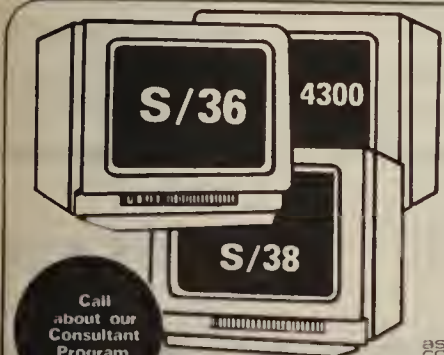


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NYC Bureau of Personnel Development
220 Church St., Room 421
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(212) 566-8735

Sealed bids will be received by the San Diego Transit Corporation, Purchasing Department at its offices, 100 16th Street, San Diego, California, 92101 until 11:00 A.M., December 23, 1987 at which time bids will be publicly opened and read for the following:

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In accordance with the corporation's specifications: #87025 bids shall be submitted on the proposal forms furnished by the corporation enclosed in a sealed envelope, plainly endorsed with bidder's name and marked:

SYSTEM/38 TAPE SUB-SYSTEM UPGRADE

BID #87025
BID OPENING: 11:00 A.M.
December 23, 1987

Copies of bid specifications may be obtained from Kent Tsubakihara, Purchasing Department, 100 16th Street, San Diego, California, 92101, Phone: (619) 238-0100 Ext. 496.

The San Diego Transit Corporation hereby notifies all bidders that in regard to any contract entered into pursuant to this advertisement, disadvantaged business enterprises will not be subjected to discrimination on the basis of race, color, sex or national origin in consideration for an award.

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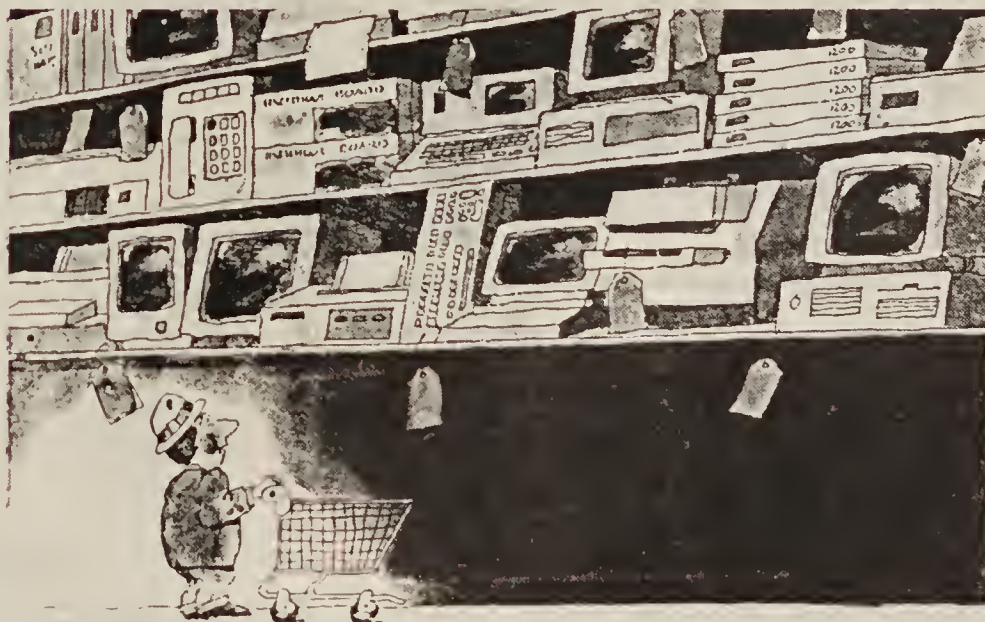
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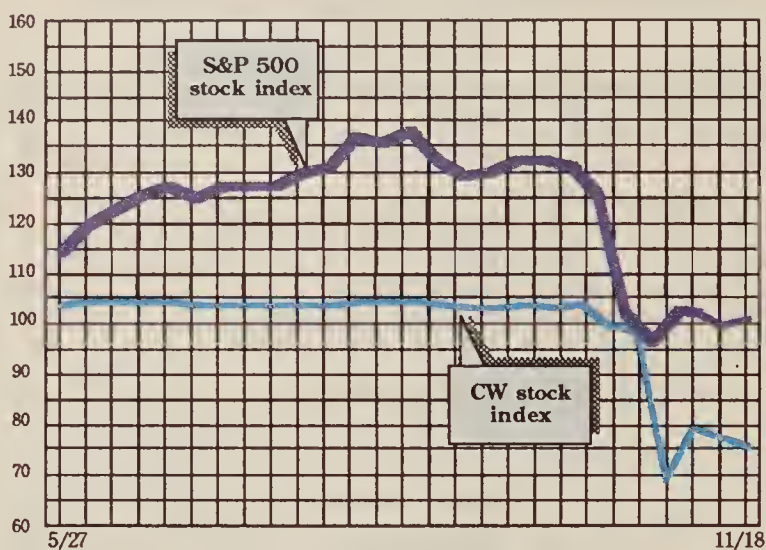
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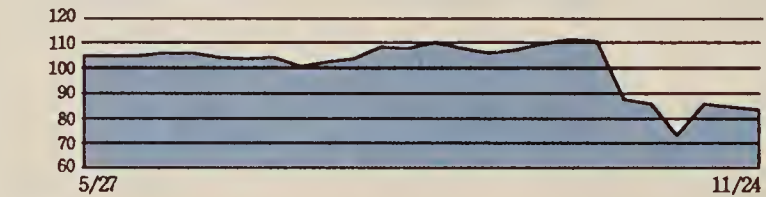
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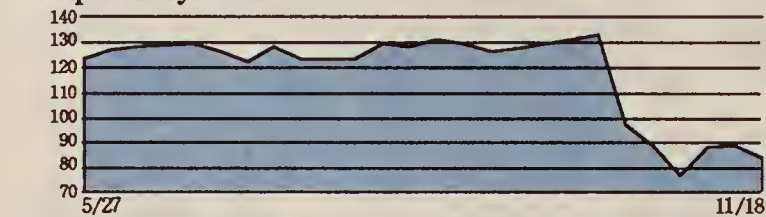


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Communications	84.3	83.0
Computer Systems	88.7	83.6
Software & DP Services	96.9	94.5
Semiconductors	55.1	51.1
Peripherals & Subsystems	74.1	70.2
Leasing Companies	86.9	88.5
Composite Index	77.6	75.5
S&P 500 Index	99.2	100.2

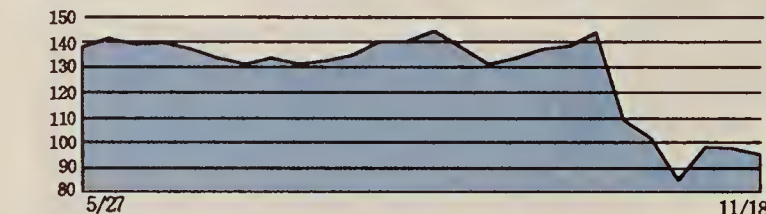
Communications



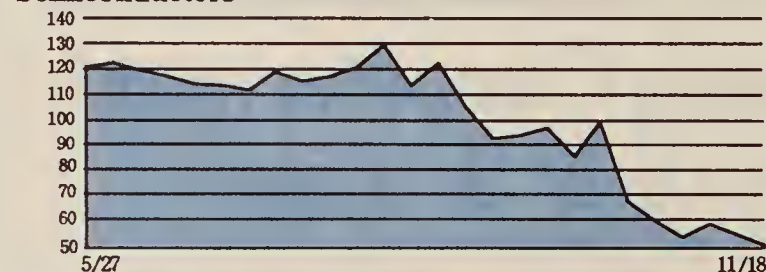
Computer Systems



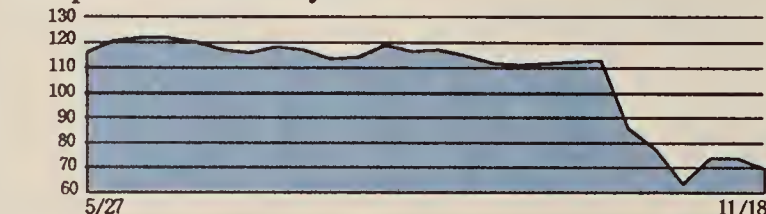
Software and DP Services



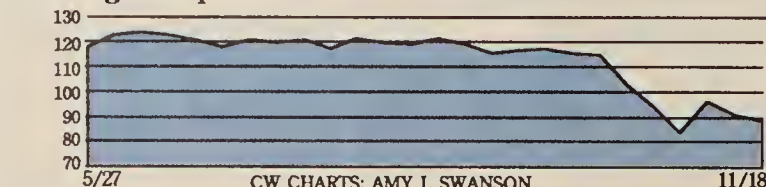
Semiconductors



Peripherals and Subsystems



Leasing Companies



CW CHARTS: AMY J. SWANSON

Computerworld Stock Trading Summary

CLOSING PRICES THURSDAY, NOVEMBER 19, 1987

EXCH	52-WEEK RANGE (1)	PRICE CLOSE NOV. 18 1987	WEEK NET CHNGE	WEEK PCT CHNGE
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Communications and Network Services

N	AMERICAN INFO TECHS CORP	100	74	85.13	-1.75	-2.01
N	ANDREW CORP	19	11	11.00	-0.75	-6.38
N	ARTEL COMM CORP	5	2	2.00	-0.13	-5.88
N	AT&T	36	20	28.25	-1.63	-5.44
Q	AVANT GAROE COMP INC	6	2	2.63	0.25	10.53
Q	AVANTEK INC	19	7	8.63	0.25	2.99
N	AYDIN CORP	38	16	19.63	-0.75	-3.68
N	BELL ATLANTIC CORP	80	61	68.13	-2.50	-3.54
N	BELLSOUTH CORP	44	29	37.50	-1.38	-3.54
Q	FIBRONICS INT	28	12	15.00	0.25	1.69
Q	COMPRESSION LABS INC	8	2	3.25	-0.13	-3.70
Q	COMPUTER NETWORK TECH	6	2	2.44	0.06	2.65
Q	CONTEL CORP	40	25	28.50	0.00	0.00
Q	DATA SWITCH CORP	9	4	5.13	-0.13	-2.38
Q	DIGITAL COMM ASSOC	49	20	24.13	-0.63	-2.53
Q	DYNATECH CORP	44	14	18.75	-1.75	-8.54
Q	EQUATORIAL COMM CO	5	2	3.13	-0.06	-1.98
Q	GANDOLF TECHNOLOGIES	11	5	6.25	0.63	11.11
Q	GENERAL DATA COMM INDS	14	3	4.88	0.00	0.00
Q	GTE CORP	45	29	36.00	0.38	1.05
Q	INFOTRON SYS CORP	12	5	7.00	1.50	27.27
N	ITT CORP	66	45	48.13	-1.38	-2.78
N	M A COM INC	16	7	9.13	-1.25	-12.05
Q	MCI COMMUNICATIONS CORP	12	5	9.63	-0.63	-6.10
Q	MICOM SYS INC	18	7	6.75	-0.75	-10.00
Q	NETWORK SYS CORP	19	7	8.25	-0.63	-7.04
N	NORTHERN TELECOM LTD	24	14	16.25	-0.88	-5.11
Q	NOVELL INC	30	12	17.25	-1.63	-8.61
N	NYNEX CORP	78	58	67.38	-1.25	-1.82
N	PACIFIC TELESIS GROUP	34	9	27.13	-1.13	-3.98
N	PARADYNE CORP	9	4	4.00	-0.38	-8.57
A	PENRIL CORP	6	1	2.38	0.63	35.71
N	PLESSEY PLC	41	24	24.25	-1.75	-6.73
N	SCIENTIFIC ATLANTA INC	20	8	10.50	-0.50	-4.55
N	SOUTHWESTERN BELL CORP	46	22	35.50	-1.88	-5.02
Q	3 COM CORP	26	12	16.75	-1.25	-6.94
N	TIMEPLEX INC	41	17	29.75	-1.50	-4.80
Q	UNGERMANN BASS INC	16	6	7.25	-1.00	-12.12
N	U S WEST INC	60	43	50.38	-0.88	-1.71

Computer Systems

Q	ALLIANT COMPUTER SYS	37	5	6.50	-0.75	-10.34
Q	ALPHA MICROSYSTEMS	6	3	4.00	0.00	0.00
Q	ALTOS COMPUTER SYS	17	9	10.50	-1.38	-11.58
A	AMDAHL CORP	50	19	27.75	-2.25	-7.50
Q	APOLLO COMPUTER INC	25	9	9.50	-1.00	-9.52
Q	APPLE COMPUTER INC	60	17	34.50	-4.25	-10.97
N	BOLT BERANEK & NEWMAN	30	12	13.63	-1.13	-7.63
Q	BRITTON LEE INC	5	2	1.75	-0.25	-12.50
N	COMPAQ COMPUTER CORP	79	17	49.38	-6.00	-10.84
Q	COMPUTER AUTOMATION INC	17	3	8.75	1.00	12.90
A	COMPUTER CONSOLES INC	12	2	2.88	-0.13	-4.17
Q	CONCURRENT COMP CORP	24	11	15.00	-1.00	-6.25
N	CONTROL DATA CORP DEL	38	18	22.00	-0.63	-2.76
Q	CONVERGENT TECH	12	3	3.00	-0.31	-9.45
Q	CONVEX COMPUTER CORP	22	6	7.63	-0.75	-8.96
N	CRAY RESH INC	136	47	67.88	-3.38	-4.74
Q	DAISY SYS CORP	13	5	6.88	0.00	0.00
N	DATA GEN CORP	39	16	21.75	1.13	5.45
N	DATAPoint CORP	9	3	4.75	-0.75	-13.64
N	DIGITAL EQUIP CORP	200	100	125.50	-9.00	-6.69
N	FLOATING POINT SYS INC	17	4	4.00	-0.13	-3.03
N	GOULD INC	34	8	12.50	-0.38	-2.91
N	HARRIS CORP	43	24	24.75	-1.25	-4.81
N	HEWLETT PACKARD CO	74	36	49.63	-2.13	-4.11
N	HONEYWELL INC	91	49	56.63	0.00	0.00
N	IBM	176	102	115.63	-6.63	-5.42
Q	INFORMATION INTL INC	17	9	10.00	0.00	0.00
Q	IPL SYS INC	3	2	2.25	-0.13	-5.26
Q	MASS COMPUTER CORP	14	6	6.88	-0.88	-11.29
N	MATSUSHITA ELEC INOL LTD	196	93	160.50	3.38	2.15
Q	MEGADATA CORP	7	3	3.25	0.00	0.00
Q	MENTOR GRAPHICS CORP	39	14	16.00	-3.50	-17.95
N	NBI INC	14	4	4.88	-0.25	-4.88
N	NCR CORP	87	44	61.63	-5.25	-7.85
N	PRIME COMPUTER INC	31	12	14.13	-1.25	-8.13
Q	PYRAMIO TECHNOLOGY	12	4	6.25	-0.50	-7.41
Q	STRATUS COMPUTER	41	15	19.75	-1.25	-5.95
Q	SUN MICROSYSTEM INC	46	14	27.75	-6.38	-18.68
Q	SYMBOLICS INC	6	1	1.63	0.00	0.00
N	TANDEM COMPUTERS INC	38	17	23.88	0.00	0.00
N	TANVOY CORP	57	31	33.50	-1.75	-4.96
N	ULTIMATE CORP	37	16	20.50	-2.88	-12.30
N	UNISYS CORP	48	24	31.00	-1.88	-5.70
A	WANG LABS INC	19	10	10.63	-0.75	-6.59

Software & DP Services

Q	ADVANCEO COMP TECH	6	3	3.50	-0.13	-3.45
N	ADVANCEO SYS INC	35	15	24.50	-2.00	-7.55
N	AGS COMPUTERS INC	30	11	14.75	0.13	0.85
Q	AMERICAN MGMT SYS INC	20	9	11.63	0.13	1.09
Q	AMERICAN SOFTWARE INC	22	6	8.63	0.00	0.00
N	ANACOMP INC	11	3	5.50	0.13	2.33
Q	ANALYSTS INTL CORP	10	4	6.25	0.00	0.00
Q	ASHTON TATE	33	13	18.25	-0.25	-1.35
Q	ASK COMPUTER SYS INC	17	6	8.50	0.75	9.68
Q	AUTODESK INC	34	12	16.00	-2.00	-11.11
N	AUTO DATA PROCESSING	55	16	41.00	-0.75	-1.80
Q	BOOLE & BABBAGE INC	12	5	6.88	0.38	5.77
N	COMPUTER ASSOC INTL INC	37	13	24.38	-1.50	-5.80
Q	COMPUTER HORIZONS CORP	15	8	9.00	-0.38	-4.00
N	COMPUTER SCIENCES CORP	73	37	46.00	-3.50	-7.07
N	COMPUTER TASK GROUP INC	18	9	10.25	-0.13	-1.20
Q	COMSHARE INC	28	12	14.50	0.50	3.57
N	CULLINET SOFTWARE INC	14	5	6.38	0.13	2.00
Q	CYCARIS SYS INC	10	6	6.13	-0.25	-3.92
Q	DUQUESNE SYS INC	33	10	15.00	0.50	3.45
N	GENERAL MTRS (CLS E)	51	24	34.00	-1.75	-4.90
Q	HOGAN SYS INC	17	5	6.00	-0.13	-2.04
Q	INFORMIX CORP	31	9	18.38	0.88	5.00
Q	INTELLICORP INC	11	3	3.75	0.00	0.00
Q	KEANE INC	10	5	5.50	-0.25	-4.35
Q	LOTUS DEV CORP	40	16	23.50	-5.25	-18.26
Q	MANAGEMENT SCI AMER	21	7	7.38	-0.38	-4.84
Q	MICRO PRO INTL CORP	8	2	4.19	-0.44	-9.45
Q	MICROSOFT CORP	79	21	46.25	-3.75	-7.50
Q	NATIONAL DATA CORP	34	19	22.50	-1.50	-6.25
Q	ON LINE SOFTWARE INTL INC	22	8	10.75	0.00	0.00
Q	ORACLE SYS CORP	38	9	20.50	-2.50	-10.87
N	PANSOPHC SYS INC	28	11	13.75	1.25	10.00
Q	POLICY MGMT SYS CORP	30	15	17.75	-0.75	-4.05
Q	PROGRAMMING & SYS INC	14	8	8.00	-0.25	-3.03
Q	REYNOLDS & REYNOLDS CO	39	15	16.25	-0.50	-2.99
Q	SEI CORP	18	9	14.00	-0.25	-1.75
Q	SHARED MED SYS CORP	53	19	21.25	-0.13	-0.58
Q	SOFTWARE AG SYSTEMS INC	19	9	9.38	-0.38	-3.85
Q	SOFTWARE PUBG CORP	17	5	6.75	-0.50	-6.90
A	STERLING SOFTWARE INC	16	6	8.38	0.38	4.69
Q	SUNGARD DATA SYS INC	21	10	11.75	-0.50	-4.08
Q	SYSTEMATICS INC	30	17	24.00	-1.00	-4.00
N	SYS. SOFT INC.	24	7	10	-1.38	-12.22
N	URS CORP	23	11	12.00	0.00	0.00
Q	VM SOFTWARE INC	45	9	9.13	-0.63	-6.41

Semiconductors

N	ADV MICRO OEVES INC	25	10	9.88	-0.88	-8.14
N	ANALOG OEVES INC	24	9	10.00	-0.50	-4.76
Q	ANALOGIC CORP	13	6	7.63	0.00	0.00
Q	INTEL CORP	42	13	21.63	-3.25	-13.07
Q	LSI LOGIC CORP	17	7	7.25	-0.63	-7.94
N	MOTOROLA INC	74	35	40.75	-2.50	-5.78
N	NATL SEMICONDUCTOR	22	10	11.75	-0.75	-6.00
N	TEXAS INSTRS INC	80	36	39.50	-3.75	-8.67
A	WESTERN DIGITAL CORP	33	12	12.88	-0.75	-5.50

Peripherals

Q	ALLOY COMP.	12.75	4.5	6.5	-0.13	-1.89
N	AM INTL INC	9	3	5.38	0.63	13.16
Q	AST RESH INC	23	6	6.75	-1.38	-16.92
Q	AUTO TROL TECH CORP	9	3	3.75	-0.25	-6.25
Q	BANCTEC INC	16	6	6.38	-1.00	-13.56
Q	CIPHER DATA PRODS INC	18	4	5.25	-0.88	-14.29
A	COGNITRONICS CORP	5	2	2.50	0.00	0.00
N	COMPUGRAPHIC CORP	28	19	21.00	-1.00	-4.55
N	COMPUTERVISION CORP	23	7	7.75	-1.38	-15.07
A	QATAPRODUCTS CORP	24	7	7.63	-1.25	-14.08
A	DATARAM CORP	9	6	6.38	0.13	2.00
N	DECISION INOS CORP	13	4	7.75	0.50	6.90
N	EASTMAN KODAK CO	71	42	47.38	-1.88	-3.81
Q	E M C CORP MASS	29	10	14.50	-0.50	-3.33
Q	EMULEX CORP	10	4	4.00	-1.00	-20.00
Q	EVANS & SUTHERLAND	40	18	19.75	0.50	2.60
Q	ICOT CORP	13	3	4.13	-0.13	-2.94
Q	INTERLEAF INC	24	9	13.50	-1.38	-9.24
Q	IONEGA CORP	8	1	1.63	-0.25	-13.33
Q	LEE OATA CORP	10	3	3.13	-0.25	-7.41
Q	MASSTOR SYS CORP	6	1	1.75	0.06	3.67
Q	MAXTOR CORP	34	6	6.75	-0.75	-10.00
Q	MICROPOLIS CORP	44	13	18.50	-1.25	-6.33
Q	MINISCRIBE CORP	18	5	6.63	-0.38	-5.36
N	MINNESOTA MNG & MFG CO	84	45	61.50	1.00	1.65
A	MSI OATA CORP	24	11	15.00	0.00	0.00
Q	PRIMAR CORP	6	1	1.63	-0.13	-7.14
Q	PRINTRONIX INC	13	8	8.00	-0.88	-9.86
Q	QMS INC	27	12	13.00	-0.38	-

Fed buyers march to different tune

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — A study released last week showed some striking differences between the computer buying patterns of the federal government and Fortune 1,000 corporations, highlighted by the tremendous success of Zenith Data Systems in selling microcomputers to the federal sector.

Zenith Data Systems, a unit of Zenith Electronics Corp. in Glenview, Ill., has a mere 1% market share in the Fortune 1,000 but has gained a 22% share at federal agencies, mostly in the U.S. Department of Defense, according to Computer Intelligence, a La Jolla, Calif.-based market research firm.

A Computer Intelligence spokesman said Zenith's market share came largely at the expense of IBM, which has a 57% share of the federal microcomputer pie, compared with 74% in the Fortune 1,000.

The study of 4,599 federal data processing sites was released at a conference sponsored by the Computer and Communications Industry Association to help vendors understand and penetrate the often mysterious market. The federal government is expected to spend \$17.1 billion on information systems in fiscal 1988.

Zenith's success is explained by the fact that, during the last three years, the company has won more than \$400 million worth of federal contracts for desktop and laptop micros, such as the \$104 million contract for 90,000 laptop micros awarded in

August [CW, Aug. 17].

The firm's highly publicized victories are likely to lead to further sales. When federal microcomputer managers were asked which micros they plan to purchase in the next 12 months, 36% mentioned Zenith and 38% mentioned IBM, according to Computer Intelligence.

The survey indicated that when federal agencies buy IBM micros, they tend to be the older Personal Computer, PC XT and AT models. Only 7% of the micros sold to the federal government next year are expected to be IBM's new Personal System/2 models, compared with 32% in the Fortune 1,000.

Systems integration

The broadest trend is the government's increasing use of systems integrators — such as Planning Research Corp., Electronic Data Systems Corp. and Computer Sciences Corp. — to oversee huge information systems contracts, according to several analysts.

Thomas L. Hewitt, president of Federal Sources, Inc., a Vienna, Va.-based consulting firm, said the government is ahead of the private sector in turning to systems integrators.

The Computer Intelligence study highlighted several other differences between the federal and corporate sectors:

- The federal sector lags behind Fortune 1,000 firms in implementing high-speed digital networks. For example, the survey showed that 15% of federal sites use T1 facilities, compared with 24% of the Fortune 1,000 sites.
- Federal agencies have been

slow to adopt IBM's 3090 series of mainframes. Only 3% of federal IBM-compatible mainframes are in the 3090 series, compared with 15% in the Fortune 1,000.

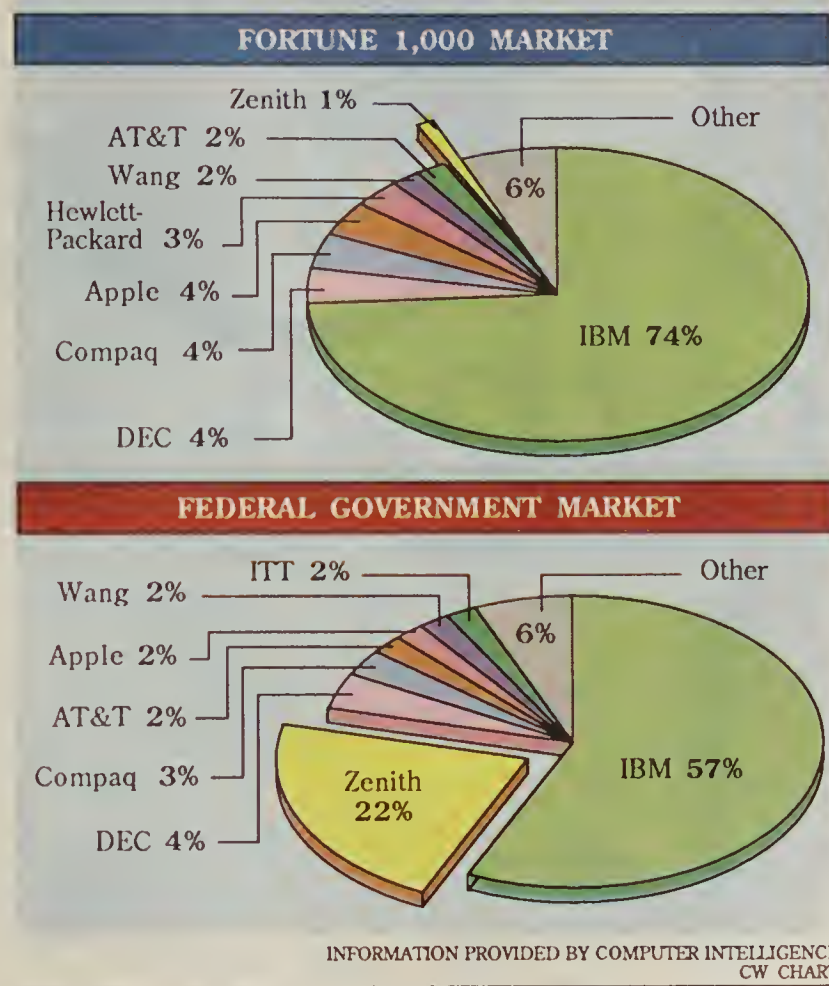
• The government is a good market for IBM plug-compatible manufacturers (PCM) such as Amdahl Corp. and National Advanced Systems Corp., a unit of National Semiconductor Corp., since federal regulations prohibit agencies from specifying the IBM brand name. PCMs have a

21% share of the government's IBM-compatible mainframe market — compared with 6% in the Fortune 1,000 — and that share is expected to grow in the coming year.

The market study also exploded the myths that federal computers are generally obsolete and generally situated in the Washington area, according to Hugh M. Tietjen, president of Computer Intelligence. He said federal systems are only slightly older than those in the Fortune 1,000, and only 14% of federal systems are located in the Washington area.

The squeeze is on

Zenith Data Systems' PCs are little used in big business but are popular in the government sector



Unisys

FROM PAGE 1

frames, the A17 family. Unisys has said it plans to maintain both product families with the basic bridges between them being communication links and fourth-generation languages.

Page said the first performance boost for the 1100 series came in July, when Unisys announced the 1100/90 Model II series, which uses 256K-bit memory chips in place of 64K-bit chips. The special Turbo configuration, which is like the existing 1100/94 models in that it is based on four instruction processors, uses the same high-speed 16-bit memory chips used in Unisys's add-on vector processing facility. Page said those chips have an average access time of 90 msec, which is four times faster than the standard 1100/90 memory chips. Software enhancements include modification of the OS 1100 operating system to reduce the path lengths that transactions travel.

While the Turbo system was designed to provide relief for customers at capacity in the 1100 series, the configuration will not be generally available until the first quarter of 1989.

An upgrade from an existing 1100/94 includes replacement of the memory boards and addition of redundant features such as cooling and power units.

Successful year

While declining to specify future enhancements planned for the 1100 series, Page said this has been the 1100 product line's most successful year and that Unisys plans to be aggressive in improving the mainframes' price/performance levels.

One analyst who speculated about the 1100's direction was Michael Geran of E. F. Hutton & Co. in New York. Geran said the management team brought into Unisys by Burroughs Corp. when Burroughs acquired Sperry last year will not let several years pass again between price/performance boosts.

Geran said the next step, in 1988, is the connection of six or eight CPUs to form what Unisys calls "The Big Mapper" — a play on the name of one of Unisys's fourth-generation languages, Mapper. He said Unisys also is expected to announce a more powerful version of the 1100/90 during the second quarter of 1988 for delivery during the fourth quarter of 1988.

Geran also said Unisys has a project code-named Mercury under which the firm hopes to produce a competitor for the next-generation IBM mainframe. "All other things being equal, there is enough there to keep 90% of their customers happy," he said.

The 1100/94 Model II Turbo with 64M bytes of memory has a list price of \$7.3 million.

Russia

FROM PAGE 1

Yates said. Now, "we get two to three times that many," he said. Not a huge number by most standards, but the Matrix 1 is a \$1.5 million machine.

The FBI, which labeled the alleged high-tech shenanigans a very significant case," said the

Saxpy technology could allow the Soviets to build supercomputers that could anticipate missile strikes.

Yates said that claim "is a little bit of an exaggeration." However, the Saxpy technology does boast unique capabilities, industry experts said.

Peter Patton, chairman and chief scientist for the Consortium of Super Computer Re-

search, said the Saxpy technology allows the computer to create synthetic images based on radar and sonar data.

The supercomputer's operating system is its key, he said. "If there was one computer technology the Russians would want, it's Saxpy's," Patton maintained.

Batinic allegedly stole documents relating to the operating

system of the Matrix 1, a matrix processing-based system said to offer performance speeds of 250 million to 1 billion floating-point operations per second.

Other arrests

Others were implicated in what federal officials charge was a conspiracy. Also arrested were Batinic's brother, Stevan; Kevin E. Anderson, said to be a computer software designer; and Charles McVey, who had previously been arrested for selling both computer technology and hardware to the Soviets for more than 10 years.

FBI officials said Batinic, a Saxpy software engineer who resigned in September, and his accomplices attempted to sell the stolen technology for \$4 million. He could face up to 10 years in prison if convicted.

Meanwhile, Saxpy officials are basking in the afterglow of an unanticipated windfall. Said Yates, "It doesn't hurt to have articles saying our technology is so powerful the Soviets want it."

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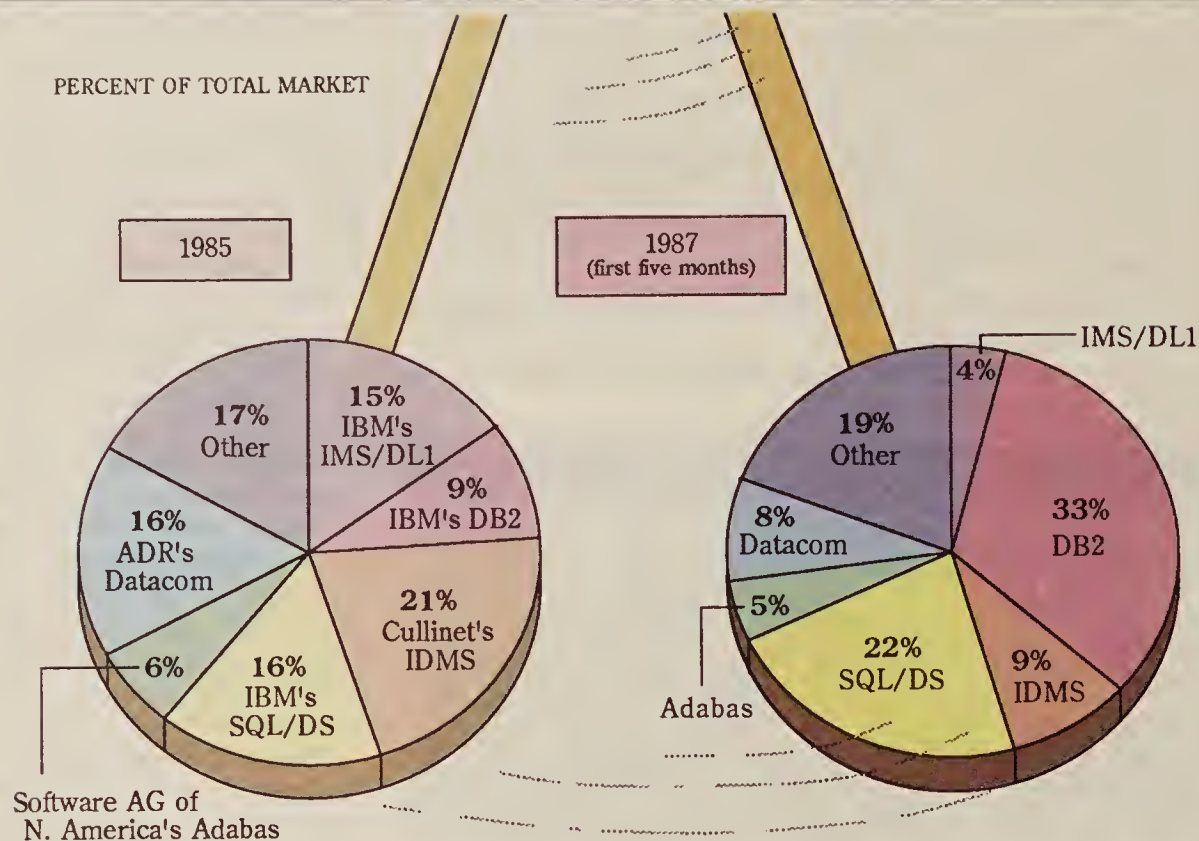


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TRENDS

DBMS

Buying intention pendulum swings toward DB2



When it comes to relational data base management systems, users are running to — or sticking with — IBM.

While one-quarter of the users who intended to purchase a DBMS in 1985 were leaning toward IBM, more than half of those planning to install a DBMS today are looking at either IBM's DB2 in the MVS environment or IBM's SQL/DS for the VM operating system, according to Focus Research Systems, Inc.

Additionally, the majority of users with DB2 intentions are current IMS users.

"Users want to be with IBM so they won't be left out in the cold when it comes to the SQL standard," said Scott Brown, market research manager at Focus Research.

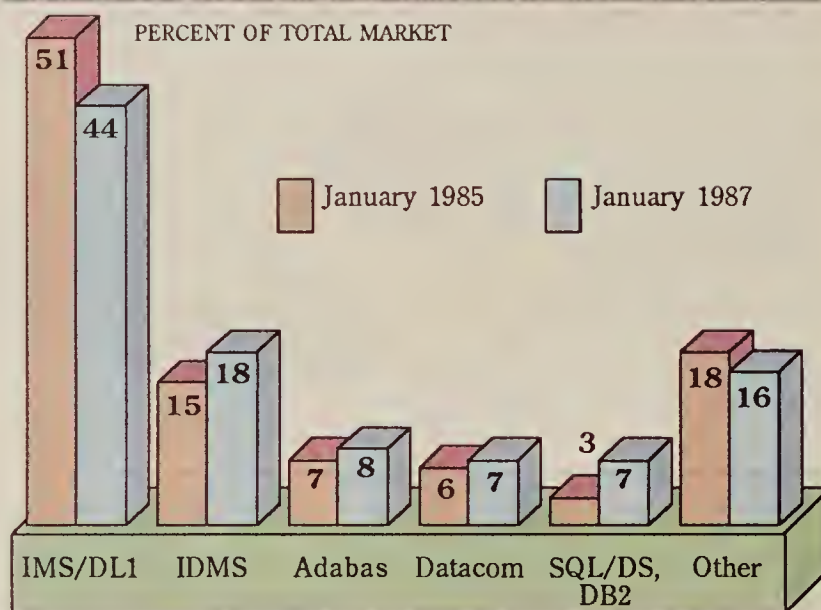
While other software companies have been introducing SQL-compatible products recently, users are nonetheless looking to IBM as the leader in this area. "Users are afraid IBM might do something [with SQL] to prevent future compatibility," Brown added.

Some software companies, like Cullinet Software, Inc. and Applied Data Research, Inc., stand to lose market share, according to the Focus Research data.

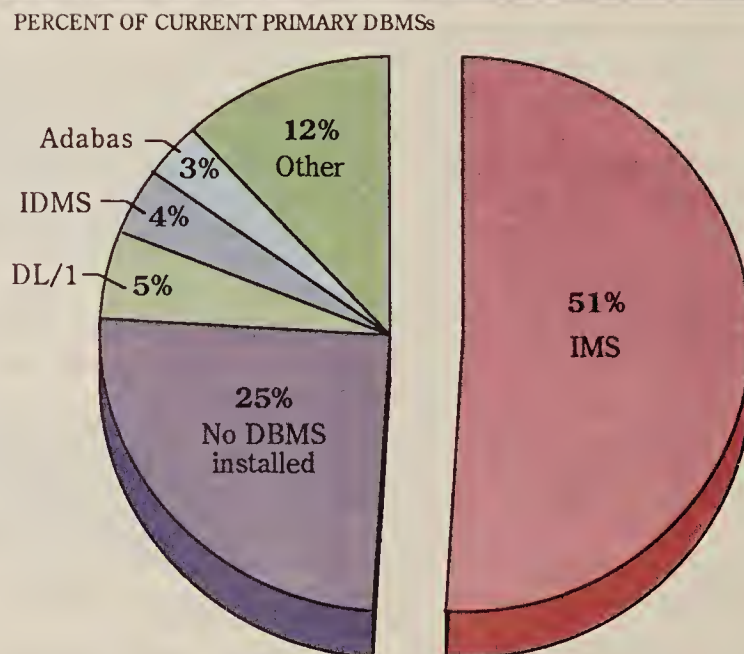
In Cullinet's case, 21% of the users polled in 1985 said they would be purchasing its DBMS, IDMS. This year, that number dropped to 9%.

ROSEMARY HAMILTON

Traditional DBMS installed base slips



Most potential DB2 buyers use IMS



INFORMATION PROVIDED BY FOCUS RESEARCH SYSTEMS, INC.
CW CHARTS: AMY J. SWANSON

INSIDE LINES

Why a DEC? In yet another attempt at the low-end market, DEC is reportedly developing a Personal VAX, a personal computer based on the VAX/VMS architecture. This PC venture would follow marginal attempts with the Pro, Rainbow and Decmate and less-than-anticipated sales of the Vaxmate. One consultant queried, "Why do they think anyone would want a third [after IBM and Apple] personal computer architecture?" The company, adhering to a policy on unannounced products, would not comment.

FAPI New Year. Word has it that Ashton-Tate's Dbase IV, due out next year, will run under both MS-DOS and OS/2. Like Lotus's 1-2-3 Release 3, Dbase will be a Family API, or FAPI, that mimics DOS functions within OS/2 but doesn't exploit OS/2's full capabilities.

Almaden vintage. The standard capacity of a 14-in. IBM disk drive spindle hung at around 1.2G bytes for a decade or so with competitors such as Control Data only recently moving that type of capacity to 8-in. drives. Last week, IBM claimed a breakthrough that could move 1.2G-byte capacities down to hard disks as small as 3½-in. Scientists at IBM's Almaden Research Center in San Jose, Calif., said they produced experimental disks with tracks only one-half a micron — 20 millionths of an inch — wide. IBM acknowledged that more work is needed to pack the tracks close together but claimed the technology could allow storage of 10G bits of data on a 3½-in. disk.

I shoulda bought insurance. The Hartford Insurance Group, which maintains a network of 5,000 terminals, sought to create a developer's workstation in the mid-1980s in conjunction with Wang Laboratories. The workstation was to increase personal productivity 28% while allowing a 15% reduction in programming staff. At the same time it was implemented at The Hartford, it was offered as a \$20,000-plus product in the marketplace. Charles W. Orsillo, director of information management at The Hartford, noted at the Data Processing Management Association's conference on software maintenance in Arlington, Va., last week that "the marketing people really took a shellacking on this. There were no customers for it."

Going down? Javelin Software is on the verge of filing for Chapter 11, according to two sources. They said the troubled company met with its lawyers last Thursday to decide on how it should proceed in handling debts to its creditors. One third-party developer said he was told by the company that he would not be receiving further payments on work he was contracted by the company to do. "I think they have enough money to maybe get them through another week," the developer said. Sources said they did not expect any companies to buy the firm before it filed for Chapter 11. Reporters were told Javelin officials were in meetings when called last week.

A Farewell to Arms. DEC and the Manufacturing Automation Protocol/Technical and Office Protocol (MAP/TOP) committee have apparently laid down their arms in the skirmish over whether Ethernet or MAP is a superior factory-floor communications network. William Witmore, DEC's vice-president for basic industries marketing, said that CEO Ken Olsen's remarks about MAP had been misunderstood by the press and the public. Of course, he said, DEC would support MAP 3.0 when it comes out in June. An olive branch was also extended, separately, by MAP User Group Chairman James Doar of Boeing Computer Services. "DEC, understandably, would like to continue to sell Decnet and Ethernet in factories," Doar said. "But they are with us in supporting and demonstrating MAP. There is no disagreement."

Going for the gold. IBM this month said it would deliver 16M- and 100M-bit Token-Ring networks within a two-year time frame. There's just one snag. Although IBM assured analysts that Olof Soderblum, the holder of the Token-Ring patent, has no problems with IBM's plans to increase the network speed, he is still after IBM for sales of IBM Token-Ring adapters that were installed in non-IBM machines.

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Babcock & Wilcox had a payroll system that was incompatible with McDermott's. So McDermott's first step was to draft a list of their new software needs. "We had a 50-item, 10-page document that listed the specifications we needed for our software," notes Jim Maumus, Payroll Specialist at McDermott. "We listed some pretty stringent requirements, but MSA had a system that was what we needed for payroll purposes. Now our payroll department responds more accurately and rapidly to corporate needs. We're saving time with our new Human Resources System, which means we're saving money."

Maumus is a good authority on the subject of payroll administration—in 1986, the American Payroll Association honored him with the national Payroll Man of the Year award. His summation assessment of MSA?

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